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Documenting the diversity of South Australia's flora

LICHENS OF KANGAROO ISLAND

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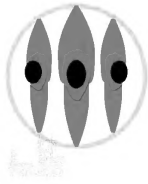

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Kantvilas, G. — South Australian lichens — A Kangaroo Island case study

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An annotated catalogue of the lichens of Kangaroo Island, South Australia

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Abstract: A ten-year study of the lichens of Kangaroo Island, South Australia, based on extensive fieldwork and a review of more than 1500 herbarium specimens, revealed a remarkable flora of 366 taxa. Fourteen appear to be restricted to the island, although they could be expected to occur on the southern Australian mainland, which is most similar to Kangaroo Island with respect to floristics and ecology, and where similar habitats can be found. In the course of the project, many species were recorded for South Australia for the first time, and a further 95 are reported here, including 19 that are first records for Australia as a whole. The most noteworthy of these include *Aspicilia praecrenata* (Nyl.) Hue, *Catillaria nigroclavata* (Nyl.) Schuler, *Clauzadea metzleri* Clauzade & Cl.Roux ex D.Hawksw., *Halecania spodomela* (Nyl.) M.Mayrhofer, *Lecania koerberiana* Lahm, *Metamelanea melambola* (Tuck.) Henssen, *Schismatomma rediunta* (Hasse) Tehler and *Strangospora pinicola* (A.Massal.) Körb., all previously known only from the Northern Hemisphere. The history of lichen investigations on the island, from the visit by Matthew Flinders in 1802 up to the present, is reviewed briefly. For the lichen study, the island's vegetation was classified into the following major habitat types: mallee woodland, *Melaleuca*-dominated swampy woodland, *Callitris*-dominated coniferous woodland, *Eucalyptus*-dominated dry sclerophyll forest, *Allocasuarina* woodland, the littoral zone, agricultural land, consolidated calcareous soil communities, and semi-inundated rocks in fresh-water streams.

Keywords: Australia, biodiversity, islands, lichenised fungi, new records

Introduction

Kangaroo Island lies off the south-eastern coast of South Australia at a latitude of 36°S. With an area of approximately 4400 km², it is Australia's third largest island, after Tasmania and Melville Island. Its relatively small population (<5000 permanent residents), the fact that large areas remain uncleared and about 25% of the island occurs in some form of nature reserve, and the absence of some exotic pests, such as the rabbit, means that it has retained significant elements of its natural environment in a relatively unspoiled state. There is a considerable body of literature dealing with the island's flora, fauna and physical features (e.g. Davies *et al.* 2002; Robinson & Armstrong 1999). However, prior to the commencement of the present project in 2008 (see Kantvilas 2018a), the island's lichens had been investigated only cursorily, and certainly not in any systematic way. For example, the sole reference exclusively for South Australia's lichens, the now outdated handbook by Filson & Rogers (1979), makes no specific reference to Kangaroo Island. This paper offers the first detailed inventory of the lichen flora, based on a review of herbarium collections and on the author's field investigations.

Collectors of Kangaroo Island lichens

The first lichen collections from Kangaroo Island are likely to have been made by Robert Brown, botanist with Matthew Flinders' *Investigator* expedition, which brought the first Europeans to the island in March 1802. Brown's name is associated mostly with the vascular flora, but he did collect lichens, although no Kangaroo Island specimens are cited in the catalogues of his lichen collections (Crombie 1879; Groves & Moore 1989). Nor have any been located by the author in searches of the lichen herbarium of London's Natural History Museum (BM) where Brown's primary collections are housed. If any lichens were indeed collected, they were presumably lost with other Brown specimens during the ill-fated voyage of the *Porpoise* in August 1803; Stearn (1960) asserts that the "best specimens of the South Coast" perished. Similarly, there is no documented evidence of any lichen collections made during Baudin's landing on the island a few months later and again in 1803.

Collectors of Kangaroo Island lichens are summarised in Table 1. The oldest lichen collections located during the present study are of the soil-growing species *Cladia aggregata* and *Cladonia capitellata* var. *squamatica*, made

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Table 1. Lichenological exploration of Kangaroo Island since first European contact in 1802.

period	herbarium specimens collected	major collectors	number of first records for the island
up to 1900	2	Tepper	2
1900–1980	*c.* 125	Cleland, Seppelt, Jackson	47
1980–2007	*c.* 470	Stove, Elix, Kraehenbuehl, Lumbsch, Streimann, Rogers	122
2008–present	934	Kantvilas	195

in 1884 by Otto [J.G.O.] Tepper, a prolific collector of vascular plants and other specimens, entomologist at the South Australian Museum, and correspondent of Ferdinand Mueller. Although the former species is still common on the island today, significantly, the latter species has not been collected since, although it is widespread and common elsewhere in Australia.

There is a small but significant number of specimens dating from the 1970s and early 1980s attributed to several collectors. The more prolific of these include Island residents Kathie Stove and the late G. (Ida) Jackson, as well as Darrell Kraehenbuehl and Eric Jackson. These collections are held almost exclusively in the State Herbarium of South Australia (AD), are generally of poor quality and are clearly fortuitous. In many cases, the species records derived from them required much painstaking "forensic work" by the author, sorting mixed gatherings of twigs and plant fragments.

In 1985, the island was visited by the Canberra-based lichenologist Jack (J.A.) Elix and his father, Louis. They compiled a large collection spanning many groups, but especially the Parmeliaceae, which is housed in the Australian National Herbarium in Canberra (CANB), but with some duplicates distributed to other herbaria. Several Elix collections have been cited in taxonomic papers by other specialist lichenologists. In 1994, the prolific Canberra-based collector, Heinar Streimann, visited the island, accompanied by Thorsten Lumbsch and Andreas Dickhäuser from Germany. They collected widely and their primary collection is housed at CANB, but some duplicates have been distributed to AD and elsewhere. There are also duplicates in Essen where Lumbsch and Dickhäuser were then resident (H.T. Lumbsch, pers. comm.), but these collections have not been examined during the present study. In 2007, the island was visited by Rod Rogers, whose collections are housed in BRI.

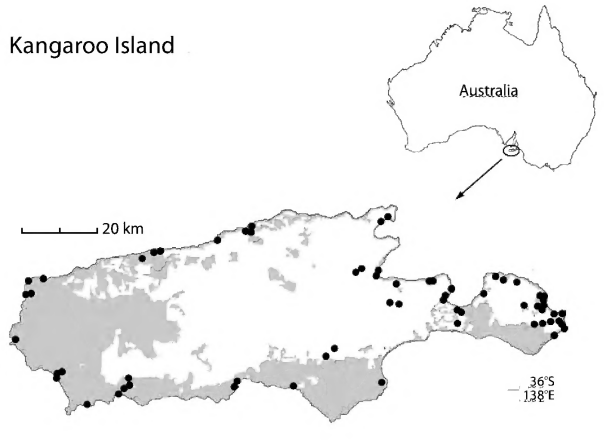

Fig. 1. Kangaroo Island showing the author's collecting localities (2008–2015). The green shading indicates the approximate extent of natural vegetation, adapted from Robinson (1999a).

The author (together with Brigitte de Villiers) first visited the island in 2008 when some limited but interesting collections were made. During six further visits from 2009 to 2015, these initial, casual collections and observations developed into a strategic pursuit of species and habitats (Fig. 1). These collections are housed in the Tasmanian Herbarium (HO), but with large numbers of duplicates distributed to AD and smaller numbers elsewhere. In the course of this work, a steady trickle of new discoveries, based on collections from the island, was published in a series of papers, starting with that of *Ochrolechia insularis* (Lumbsch *et al.* 2011). These are summarised in Table 2.

General features of the lichen flora

A total of 366 taxa are here recorded for the island. Most are shared with southern Australia and eastern Tasmania, where a similar Mediterranean-maritime climate occurs. Many new records for South Australia have been recorded in previous papers emanating from the project. A further 95 are reported here, of which 18 are new records for Australia as a whole. Most noteworthy of these include *Aspicilia praecrenata*, *Catillaria nigroclavata*, *Clauzadea metzleri*, *Halecania spodomela*, *Lecania koerberiana*, *Metamelanea melambola*, *Schismatomma rediunta* and *Strangospora pinicola*, which were previously unrecorded for the Southern Hemisphere. Fourteen species are known only from Kangaroo Island, although this rather high figure is most certainly a product of the concentrated study, and most of these species are eventually likely to be found elsewhere. An exhaustive inventory for an area as large as Kangaroo Island is an impossible goal, as there will always be localities that will not have been comprehensively surveyed. Well in excess of 400 taxa

Table 2. Lichens based on type specimens from Kangaroo Island.

taxon	reference	distribution
Amandinea devilliersiana Elix & Kantvilas	Elix & Kantvilas (2013a)	KI, Tas
Amandinea dudleyensis Kantvilas & Elix	Elix & Kantvilas (2013a)	KI, NZ
Amandinea lignicola var. *australis* Elix & Kantvilas	Elix & Kantvilas (2013a)	south-eastern Australia, Tas
Anisomeridium austroaustraliense P.M.McCarthy & Kantvilas	McCarthy & Kantvilas (2016a)	KI
Arthonia caliciae Kantvilas & Wedin	Kantvilas & Wedin (2015)	KI
Arthonia insularis Kantvilas & Wedin	Kantvilas & Wedin (2015)	KI
Bacidia brigitteae Kantvilas	Kantvilas (2017)	KI
Buellia extenuatella Elix & Kantvilas	Elix & Kantvilas (2013b)	southern mainland Australia
Buellia subadjuncta Elix & Kantvilas	Elix *et al.* (2017)	KI, NZ
Caloplaca aggregata Kantvilas	Kantvilas (2016a)	KI
Caloplaca gilfillaniorum Kantvilas & S.Y.Kondr.	Kantvilas & Kondratyuk (2013)	KI
Caloplaca piscatorica Kantvilas & S.Y.Kondr	Kantvilas & Kondratyuk (2013)	KI
Caloplaca sergeyana Kantvilas	Kantvilas (2016a)	KI
Catillaria austrolittoralis Kantvilas & van den Boom	Kantvilas & van den Boom (2013)	south-eastern Australia, Tas
Lecania maritima Kantvilas & van den Boom	Kantvilas & van den Boom (2015)	south-eastern Australia, Tas
Lecidella granulosula var. *lecanorina* Kantvilas & Elix	Kantvilas & Elix (2014)	KI, NSW, Tas
Lecidella leucomarginata Kantvilas & Elix	Kantvilas & Elix (2014)	KI, WA
Micarea kartana Kantvilas & Coppins	Kantvilas (2018d)	KI
Ochrolechia insularis Kantvilas & Elix	Lumbsch *et al.* (2011)	KI
**Pertusaria melanospora* var. *sorediata* Elix & A.W.Archer	Elix & Archer (2013)	south-eastern Australia, Tas
Psoroglaena halmaturina P.M.McCarthy & Kantvilas	McCarthy & Kantvilas (2013a)	KI
Sarcogyne meridionalis P.M.McCarthy & Kantvilas	McCarthy & Kantvilas (2013b)	KI, SA, Flinders Island
Tephromela baudiniana Kantvilas & Elix	Kantvilas & Elix (2017)	KI
Thelidium robustum P.M.McCarthy & Kantvilas	McCarthy & Kantvilas (2016b)	KI
Xanthoparmelia wisangerensis Elix & J.Johnst.	Elix & Johnston (1987)	KI

* treated here as a synonym of the widespread *Pertusaria crassilabra* Müll.Arg.

is considered to be a reasonable estimate of the island's species richness.

When compared with other places studied by the author, Kangaroo Island appears to have a rather depleted lichen flora. Many species, even ones which can be very common elsewhere in Australia, are relatively uncommon or highly localised on the island. After the initial surge of new discoveries, a considerable effort, searching ever more specialised niches or restricted habitats, was required to find additions for the list. By comparison, Tasmania, which admittedly is 14 times larger, probably has a lichen flora of at least 1500 species, and even tiny Flinders Island, which is only one third the size of Kangaroo Island, has an estimated flora of at least 500 species (author's unpublished observations).

One possible explanation for this is low habitat diversity: the low relief (the highest point is just 300 m a.s.l.), relatively low and uniform rainfall (500–700 mm per year) and Kangaroo Island's shape (no place is more than 25 km from the coast) means it is does not offer the range of habitats that other islands might. Recurring fires have had an enormous impact on the island's vegetation (Peace & Mills 2012), and are potentially very severe in the absence of natural boundaries such as large rivers or mountains (Kantvilas 2018a). The fire of 2007 destroyed about 20% of the island's vegetation cover, especially in reserved areas in the west; eight years later, casual observations indicate that recovery of lichens has, for the most part, been minimal.

Fragmentation of the natural vegetation is a major issue on Kangaroo Island (Robinson 1999b) and has

Fig. 2. Limestone (white rocks, foreground) and non-calcareous rock types (distant) can occur in close proximity (Stokes Bay area).

Fig. 3. Mallee, Kelly Hill Caves area. The complex understorey of subdominant trees and small shrubs provides a potentially lichen-rich habitat.

a major impact on lichens. The earliest European observations by Flinders' expedition (e.g. see Edwards 1981; Vallance *et al.* 2001) describe the island as being "wooded". Since then, there has been extensive clearing for agriculture, development for housing and recreation, and conversion to forest plantations. Some woodland types, for example mallee and communities dominated by *Melaleuca* or *Callitris*, have been particularly affected (see Kantvilas 2018b). The extensive nature reserves, mainly in the west and south, cater well for some vegetation types but less so for others. As a result, many habitats and their associated species are now rare on the island, and isolated rock outcrops, mature trees and small woodland remnants along roadsides and in paddocks provide critical but highly fragile refugia for lichens in otherwise severely modified landscapes.

Major lichen habitats and factors affecting distribution

The main determinants of the composition and distribution of the lichens of Kangaroo Island are vegetation type and geology, and the interaction of these factors with land use and fire history.

There are major compositional differences between the lichens found on limestone and those occurring on non-calcareous rock types, and the close proximity of these starkly different substrata contributes to local species

Fig. 4. Mallee, Dudley Peninsula. Extensive areas of mallee have been cleared, leaving isolated copses and shelter belts.

Fig. 5. *Melaleuca*-dominated swampy woodland, Lashmar Lagoon. Most stands on the island have been reduced to narrow bands fringing water bodies.

richness (Fig. 2). More subtle differences have also been observed between the species assemblages on granite, laterite and sandstone. Although the whole island can be described as maritime and lowland, there are also noteworthy differences between species composition of the littoral zone and that of more inland areas.

The main vegetation types on the island were described by Kinnear *et al.* (1999), Ball & Carruthers (1999) and Ball (2002). However, lichens tend to respond to very small-scale habitat factors, in particular the availability of certain substrata (e.g. rocks, wood, charcoal, bark, soil, very old standing trees or stumps, mature understorey shrubs, etc.). A modified classification from a lichenological perspective is summarised here.

Mallee, dominated by multi-stemmed eucalypts, is one of major woodland types on the island. When occurring in continuous stands with mature dominant trees and a well-developed, species-rich understorey (Fig. 3), this vegetation type is potentially very lichen-rich. The bark of the sub-dominant small trees and shrubs, the basal stockings of the eucalypts, and patches of consolidated soil under canopy gaps are all potentially well-colonised. Where mallee has been reduced to narrow avenues along roads and paddocks, or to small shelter copses (Fig. 4), it becomes subject to windthrow, canopy collapse, and increased air flow and sunlight; the loss of lichen diversity in such remnant stands is startling. Browsing by stock in mallee shelter belts also degrades them and impedes their regeneration.

Fig. 6. *Callitris*-dominated woodland (near Pelican Lagoon).

Fig. 7. Dry sclerophyll forest dominated by eucalypts, Western River Wilderness Protected Area. The diverse understorey of *Allocasuarina*, *Exocarpos* and other sub-dominant trees and shrubs typically supports very rich communities of epiphytic lichens.

***Melaleuca*-dominated woodland** can be found fringing lagoons and larger water courses (Fig. 5). This is perhaps the closest vegetation type to wet forest on the island, and one where cyanophilic lichens (species of Lobariaceae, Pannariaceae, Collemataceae) could be expected to occur. Most of these woodlands are highly degraded, with broken canopies, weed-choked understoreys and windthrown trees. Epiphytes tend to be rare and represented mostly by common, broadly ecologically tolerant species.

***Callitris*-dominated coniferous woodland** is found on the Dudley Peninsula, typically behind sand dunes (Fig. 6). The stands are usually highly fragmented and suffer from canopy collapse, loss of the understorey, and windthrow of mature trees. Nevertheless, several lichen species that can be regarded as old forest indicators have been recorded in these woodlands, albeit as minute thalli hidden in cracks in the bark of decrepit trees.

***Eucalyptus*-dominated dry sclerophyll forest** is widespread, especially across the northern parts of the island. Where there is a well-developed understorey of subdominant trees such as *Exocarpos* or *Allocasuarina* (Fig. 7), lichens can be very diverse and conspicuous, festooning trunks, limbs and twigs. The dry, bleached wood of large, old trees, charred wood and large logs all provide specialist habitats for lichens. This community was explored the least during this study and is likely to produce significant numbers of additions to the catalogue with future work.

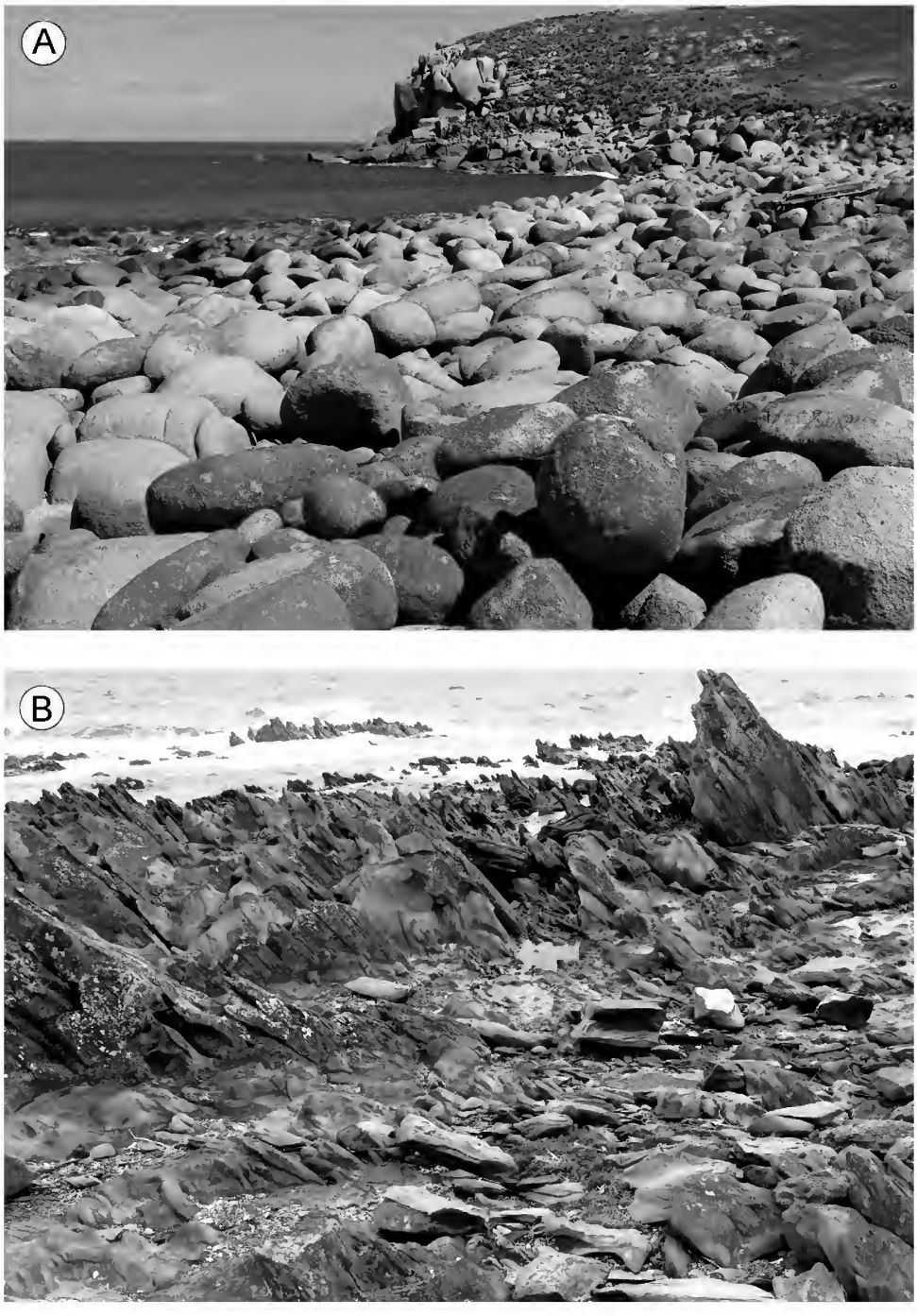

Fig. 8. The littoral zone, Dudley Peninsula. Granite (A) and laterite (B) support different lichen communities.

The littoral zone, which includes sea-shore rocks and adjacent heathlands, is one of the richest lichen habitats on the island. Different rock types tend to support different complements of species (Figs 8, 9). Where heathlands are burnt, the regenerating shrubs are typically too young to support significant epiphytes, but older shrubs can be highly colonised (Fig. 10).

Agricultural land that has been improved for cropping and pasture tends to be a lichen desert (Fig. 11), but the farming landscape in general is a very significant habitat for lichens on the island. Rock outcrops, stones, isolated trees and small wooded copses, farm buildings and fences in otherwise cleared ground can act as concentrations of lichen richness, albeit for the more common species or ones that prefer eutrophicated conditions. Whereas split eucalypt fenceposts are a good habitat, treated pine fenceposts, now widely used on the island, are relatively poorly colonised by lichens.

Consolidated, usually calcareous soil occurs in small, seemingly bare patches within woodlands and heathlands. This habitat is extremely important for lichens, with a specialised flora dominated by species of *Psora*, *Gyalolechia* and *Diploschistes*. Much of this habitat has been reduced to narrow strips along roadsides, the margins of paddocks or the edges of cliffs (Fig. 12), sometimes represented only by a few square centimetres between larger stones. Herbarium records suggest that this habitat was more extensive in the past.

Fig. 9. Eutrophication from sea-birds has a highly localised impact on the lichen flora (Cape St Albans).

Fig. 10. Coastal heathland, Hansons Bay. Most shrubs in such heathlands are too small and abraded by wind to support many epiphytes, but larger shrubs in more protected sites tend to be well colonised by lichens.

Semi-inundated rocks in fresh-water streams. Continuously running fresh water in a rocky water course is an uncommon habitat on the island but can support highly specialised lichens such as *Hymenelia lacustris*, *Ephebe ocellata* and minute cyanophilic species (Fig. 13).

***Allocasuarina* woodland.** These dry woodlands occur mostly in small patches near the coast (Fig. 14). In general, the deeply fissured, dry bark of *Allocasuarina* itself is a poor habitat for lichens, as is the ground surface, which is usually thickly covered in fallen twigs. However, one unusual species, *Anisomeridium austroaustraliense*, was discovered in this woodland type (McCarthy & Kantvilas 2016a).

Materials and methods

Specimens studied. The checklist is based exclusively on the herbarium specimens cited in the text, all of which have been examined by the author in the course of this study. Herbaria holding the material are mentioned under 'Collectors' (above) and are cited in the text. No literature references to Kangaroo Island lichens, nor any other sources such as electronic herbarium databases, have been accepted uncritically.

Identification methods. Identification of specimens is based on morphological and anatomical examination using standard methods, including high-power light microscopy of hand-cut sections of the thallus, ascomata

Fig. 11. Agricultural landscape, near Stokes Bay. Although largely a lichen "desert", isolated trees, rocks and fenceposts provide critical refugia for lichens.

Fig. 12. Calciphilous communities on consolidated soil, Stokes Bay. Although apparently much-reduced in comparison to former times, such seemingly bare areas of soil can be richly colonised by lichens and bryophytes.

and pycnidia. Mounting media included water, 15% KOH (K), Lugol's iodine, lactophenol cotton blue, ammoniacal erythrosin and 50% HNO_3 (N). Routine chemical analyses using thin-layer chromatography (t.l.c.) follow standard methods (Orange *et al.* 2001). A number of critical specimens were also analysed using high-performance liquid chromatography by Prof. J. Elix, Canberra (Elix *et al.* 2003). The author is responsible for all the identifications, but consulted specialists for assistance with specimens from selected genera (see 'Acknowledgements').

Nomenclature. For the most part, nomenclature follows *Checklist of the Lichens of Australia and its Island Territories* by McCarthy (2018) and thus conforms with currently accepted classifications. However, recent (and ongoing) investigations within some groups, based chiefly on molecular data, have led to significant name changes, particularly at generic rank, often with some controversy. In some of these, notably *Aspicilia*, *Caloplaca*, *Verrucaria*, *Xanthoria* and the *Collemataceae*, I have retained a more conservative nomenclature and apply broad generic concepts until assessments of all relevant Australian taxa have been undertaken.

Presentation of data. The entry for each species includes the currently accepted name, brief notes on diagnostic features and ecology, and a list of all specimens seen in chronological order by their collection date. Full literature citations for the species are readily available in

Fig. 13. Rocky River. Semi-inundated rocks in fresh water can be a very rich habitat for lichens. The area of most interest and greatest potential diversity is the blackish zone at or just beneath the level of the water.

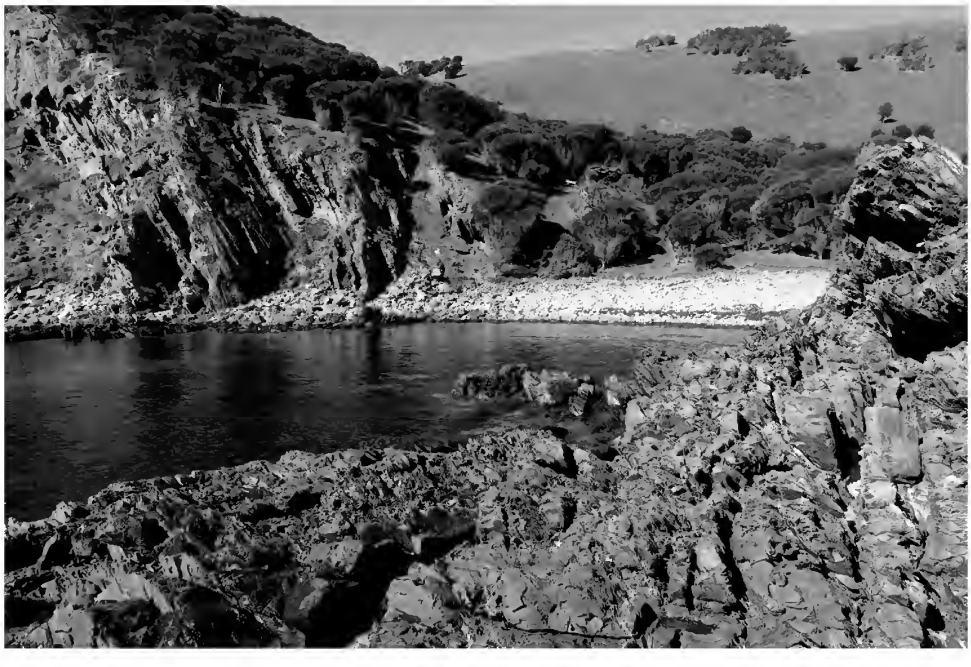

Fig. 14. *Allocasuarina*-dominated woodland, near Western River Cove.

McCarthy (2018) and elsewhere and are not repeated here. In the interests of brevity, descriptive diagnoses and reference to short-cut aids for identification are kept to a minimum where these are readily available in the literature. Exceptions are made for taxa that are identified only to genus, for those taxa whose identity is complex, where Kangaroo Island specimens deviate from the norm, or where the record cited is the first for Australia. Names based on a type specimen from Kangaroo Island are indicated with (T). Synonyms are not given except where they pertain to a type from Kangaroo Island. New records for South Australia, based on comparisons with McCarthy (2018), are indicated with (s); new records for Australia are indicated with (a).

I have elected to cite all specimens examined for two main reasons. Firstly, because checklists, at least for poorly known groups with a scant and highly dispersed pool of expertise, need to be supported by voucher specimens. My experience in compiling checklists for other areas is that the hardest task is often not collating the names of what occurs at a place, but sifting, evaluating and excluding names of species that do not, but which have been introduced on the basis of hearsay or literature. Secondly, and perhaps more importantly, Kangaroo Island is a region undergoing rapid and severe change. Where and, in particular, *when* each specimen was collected offers an insight into how the flora of the island has changed. My perception of the island is that many of the localities where collections were made in the

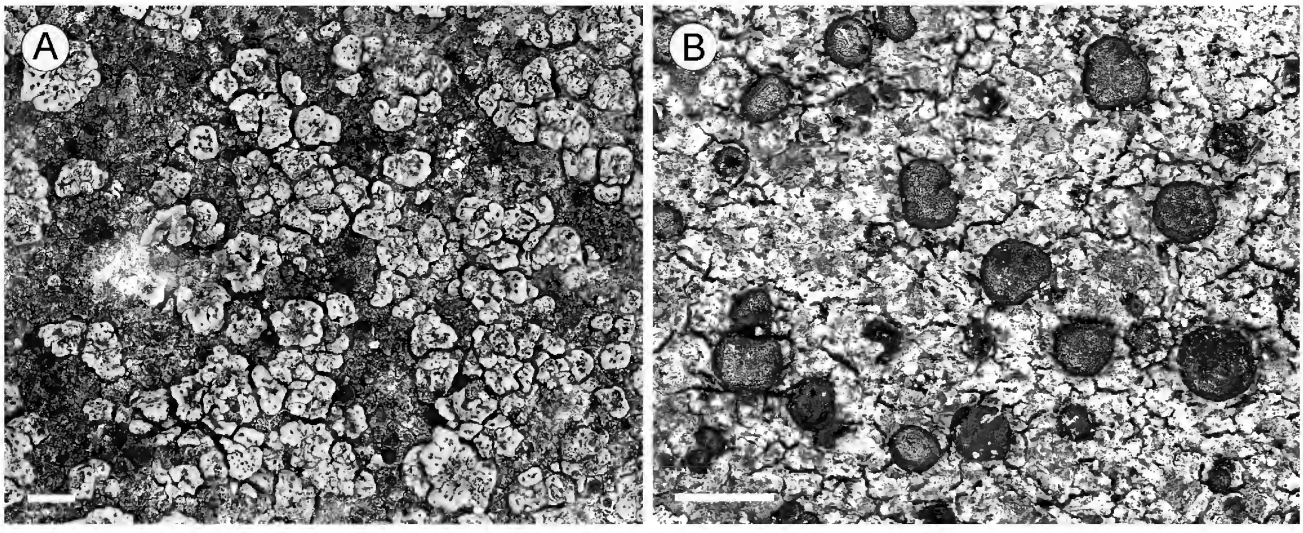

Fig. 15. A *Acarospora citrina*. **B** *Amandinea decedens*. Scales = 1 mm. Photos: J. Jarman.

past have been irreversibly altered and degraded, and that some species once recorded there are no longer present.

No checklist is ever complete and further additions are to be expected. The list is statement of the situation at the end of 2018, and is a baseline for future work. Critically, such work can now be based on a well-curated and annotated body of herbarium specimens.

Images. Photographs were taken by J. Jarman or B. de Villiers (attributed on each image) or by the author (unattributed).

The catalogue

Acarospora citrina (Taylor) Zahlbr. ex Rech.

On rocks in dry sclerophyll woodland. Characterised by the bright yellow areolate to subsquamulose thallus with immersed apothecia and polysporous asci. **Fig. 15A.**

North Coast, Middle River, *S.J. Edmonds s.n.* (MEL); Ironstone Hills, 35°43'S 137°58'E, 90 m alt., 2011, *G. Kantvilas* 311/11 (HO); Cape St Albans, 35°48'S 138°07'E, 40 m alt., 2015, *G. Kantvilas* 393/15 (HO).

[S]*Acarospora veronensis* A.Massal.

On rocks in dry sclerophyll woodland. This species is rarely collected because its scattered thallus areoles are typically widely dispersed amongst other lichens. Amongst the Australian species of the genus with a brown thallus, it is characterised by the absence of lichen substances; superficially similar species containing either gyrophoric acid or norstictic acid could be expected to occur on the island as well.

Ironstone Hills, 35°43'S 137°58'E, 90 m alt., 2011, *G. Kantvilas* 314/11 (HO); same locality, 35°44'S 137°57'E, 60 m alt., 2015, *G. Kantvilas* 387/15 *& B. de Villiers* (HO).

[S]*Amandinea decedens* (Nyl.) Blaha, H.Mayrhofer & Elix

Locally abundant on coastal rocks. Characterised by black, lecideine apothecia, often with a sparse, grey-white pruina, brown, 1-septate, ascospores, 17–24 × 9–15 µm, initially of the *Orcularia*-type, later of the *Physconia*-type, and filiform conidia. **Fig. 15B.**

Western River, 1972, *R.D. Seppelt* 820A (HO); mouth of De Mole River, 35°43'S 136°47'E, 1994, *H. Streimann* 55073, 55075, 55595 (AD, CANB); Cape St Albans, 35°48'S 138°08'E, 40 m alt., 2011, *G. Kantvilas* 366/11 (AD, HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 396/11 (HO); Ravine des Casoars, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 480/12 *& B. de Villiers* (AD, HO); W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 505/12 (HO).

[T]*Amandinea devilliersiana* Elix & Kantvilas

On coastal granite. Characterised by a pale brownish grey to dark grey, areolate thallus containing norstictic acid, *Physconia-* to *Buellia*-type ascospores, 10–17 × 6–8 µm, and filiform conidia, 15–21 µm long. Also recorded from Tasmania. **Illustration:** Elix & Kantvilas (2013a: Fig. 2).

Lesueur Conservation Park, c. 3.5 km SW of Cape Willoughby, 35°51'S 138°06'E, 10 m alt., 2009, *G. Kantvilas* 359/09, 360/09 (AD, HO); Windmill Bay, 35°51'S 138°07'E, 1 m alt., 2012, *G. Kantvilas* 494/12 (AD, CANB, HO) [type].

[T]*Amandinea dudleyensis* Kantvilas & Elix

On eucalypt twigs in avenues of mallee fringing paddocks and roadsides, and in scrubby coastal vegetation. Superficially similar to species of *Buellia sens. str.*, but distinguished by the 1-septate, brown ascospores of the *Orcularia*-type, 20–28 × 9–14 µm, the filiform conidia, 20–30 µm long, and by the lack of lichen substances. Recorded recently from Campbell Island and the Auckland Islands (Elix 2018) and likely to have been overlooked on mainland Australia. **Illustration:** Elix & Kantvilas (2013a: Fig. 3).

Chapman River Estuary, 35°50'S 138°05'E, 3 m alt., 1985, *J.A. Elix* 19693 *& L.H. Elix* (CANB); Creek Bay Farm, headwaters of Lubra Creek, 35°49'S, 138°06'E, 40 m alt., 2011, *G. Kantvilas* 383/11 (AD, CANB, HO) [type]; Stars

Road, 35°47'S 137°33'E, 65 m alt., 2012, *G. Kantvilas* 397/12 (AD, HO); Ravine des Casoars, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 484/12 *& B. de Villiers* (AD, HO); Hog Bay Road, 35°46'S 137°37'E, 20 m alt., 2013, *G. Kantvilas* 206/13 (AD, HO); Point Ellen, 36°00'S 137°11'E, 3 m alt., 2013, *G. Kantvilas* 220/13 (AD, HO); Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2013, *G. Kantvilas* 231/13 *& B. de Villiers* (AD, HO).

T*Amandinea lignicola* var. *australis* Elix & Kantvilas

On wood and bark, especially in woodland dominated by *Melaleuca* or *Callitris*, and on old mallee roots and logs in rough pasture. Recognised by the typically olive-brown, subsquamulose thallus, black apothecia, 1-septate, brown, *Physconia*-type ascospores, 13–20 × 6–8 µm, and filiform conidia. This lichen is widespread across southern Australia including Tasmania. **Illustration:** Elix & Kantvilas (2013a: Fig. 4).

Antechamber Bay, near The Kona, 35°49'S, 138°05'E, 20 m alt., 2010, *G. Kantvilas* 205/10 (CANB, HO); Lashmar Lagoon, 35°49'S 138°05'E, 20 m alt., 2011, *G. Kantvilas* 265/11, 270/11 [type], 272/11 *& B. de Villiers* (AD, HO); Chapman River, 35°48'S 138°04'E, 10 m alt., 2012, *G. Kantvilas* 400/12 *& B. de Villiers* (HO); Pelican Lagoon, 35°49'S 137°48'E, 10 m alt., 2012, *G. Kantvilas* 410/12 *& B. de Villiers* (AD, HO); slopes above Red House Bay, 35°49'S 138°07'E, 50 m alt., 2012, *G. Kantvilas* 591/12 (AD, HO); southern end of Antechamber Bay, 35°48'S 138°06'E, 10 m alt., 2013, *G. Kantvilas* 202/13 (HO).

S*Amandinea litoralis* (Zahlbr.) H.Mayrhofer & Elix

On coastal rocks. Characterised by the pale grey-brown thallus that has a non-amyloid medulla and lacks lichen substances, the *Physconia*-type ascospores, 12–17 × 6–9 µm, and the filiform conidia, 16–27 µm long (Blaha *et al.* 2016).

Mouth of De Mole River, 35°43'S 136°47'E, 1994, *H.T. Lumbsch* 10922d, *A. Dickhäuser & H. Streimann* (CANB).

Amandinea neoconglomerata Elix

Occasional on coastal rocks. This species is characterised by a very reduced thallus that lacks lichen substances, *Buellia*-type ascospores, 8–15 × 4–7 µm, and filiform conidia, 19–25 µm long (Elix *et al.* 2017).

Hog Bay, 3 km E of Penneshaw, 35°43'S 137°57'E, 15 m alt., 1994, *H.T. Lumbsch* 10897a, *A. Dickhäuser & H. Streimann* (CANB); northern end of Antechamber Bay, 35°47'S 138°04'E, 1 m alt., 2011, *G. Kantvilas* 390/11 (HO); Western River Cove, W end of beach, 35°40'S 136°58'E, 2 m alt., 2015, *G. Kantvilas* 415/15, 416/15 (AD, HO).

Amandinea punctata (Hoffm.) Coppins & Scheid.

Widely scattered on bark and wood. With its rather inapparent thallus and *Buellia*-type ascospores, 10–16 × 5–8 µm, identification of this cosmopolitan species requires observation of its rather elusive, filiform conidia, 14–22 × 0.5–1 µm.

Banks of Cygnet River near Lockwood Corner, 35°39'S 137°38'E, 1967, *G. Jackson* 531 (AD); 1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuelh s.n.* (MEL 1068706 p.p.); Creek Bay Farm, 35°51'S 138°06'E, 100 m alt., 2011, *G. Kantvilas* 416/11 (AD, HO); Chapman River, 35°48'S 138°04'E, 10 m alt., 2012, *G. Kantvilas* 398/12 *& B. de Villiers* (AD, HO); W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 497/12 (HO).

Amandinea stajsicii Elix & Kantvilas

On the twigs of coastal trees and shrubs. Superficially similar to *A. dudleyensis* but with smaller ascospores, 12–18 × 6–10 µm. **Illustration:** Elix & Kantvilas (2013a: Fig. 7).

Cape Borda, 35°45'S 136°35'E, 100 m alt., 1994, *H.T. Lumbsch* 10904, *A. Dickhäuser & H. Streimann* (CANB); northern end of Antechamber Bay, 35°47'S 138°04'E, 10 m alt., 2012, *G. Kantvilas* 509/12 (AD, HO); same locality, 2013, *G. Kantvilas* 273/13 (AD, HO); Red House Bay, 35°49'S 138°06'E, 15 m alt., 2013, *G. Kantvilas* 322/13 (HO).

T*Anisomeridium austroaustraliense* P.M.McCarthy & Kantvilas

On the bark of a dead tree in *Allocasuarina*-dominated woodland. Characterised by the pale thallus with a trentepohlioid photobiont, black perithecia to 0.35 mm wide, and 1-septate ascospores, 12–18 × 5–8 µm. Known only from Kangaroo Island but likely to occur more widely. **Illustration:** McCarthy & Kantvilas (2016a: Fig. 1).

Ironstone Hills, 35°44'S 137°57'E, 70 m alt., 2015, *G. Kantvilas* 382/15 (HO) [type].

S*Anisomeridium polypori* (Ellis & Everh.) M.E.Barr

On bark and wood in dry sclerophyll forest and coastal scrub. This is a rather inconspicuous crustose lichen with a *Trentepohlia* photobiont and black perithecia with non-amyloid asci, slender, branched and anastomosing pseudoparaphyses, and 1–3-septate ascospores, 14–20 × 4–6 µm.

Point Ellen, 36°00'S 137°11'E, 5 m alt., 2013, *G. Kantvilas* 223/13 (HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 336/15 (HO).

T*Arthonia caliciae* Kantvilas & Wedin

Lichenicolous on the thallus of *Calicium tricolor*, growing on eucalypt wood in dry sclerophyll forest. This minute species represents the first report of an *Arthonia* species parasitising a *Calicium* (Kantvilas & Wedin 2015). Known only from Kangaroo Island. **Illustration:** Kantvilas & Wedin (2015: Figs 1, 2A–E).

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 773/12 (AD, HO, S) [type].

S*Arthonia ilicina* Taylor

On the bark of *Callitris* in remnant coastal coniferous woodland; very rare. This widespread temperate crustose species is characterised by macrocephalic, 4–7-septate ascospores, 26–36 × 10–13 µm.

Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 429/12 *& B. de Villiers* (HO).

T*Arthonia insularis* Kantvilas & Wedin

Lichenicolous on the thallus of *Caloplaca eos* on granite boulders in coastal heathland. Recorded only from

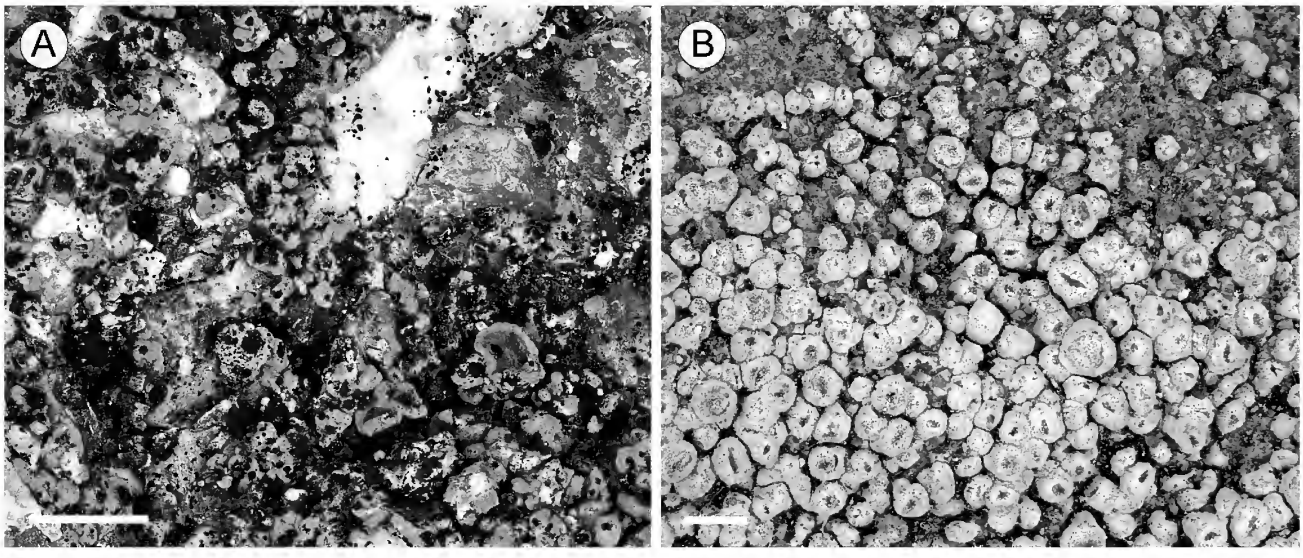

Fig. 16. A *Arthonia insularis*. **B** *Aspicilia contorta*. Scales = 1 mm. Photos: J. Jarman.

Kangaroo Island, although its host lichen is widespread in southern Australia and Tasmania. **Fig. 16A.**

W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 506/12 (AD, HO, KW, S) [type].

Arthonia intexta Almq.

Lichenicolous, infecting the apothecia of *Lecidella sublapicida*, a species found on rocks in exposed habitats (Kantvilas & Wedin 2015).

Cape Willoughby Road, 35°50'S 138°06'E, 110 m alt., 2011, *G. Kantvilas* 325/11 (HO).

Arthonia sp. A

On the twigs of *Melaleuca* in mallee woodland. This extremely inconspicuous species is characterised as follows: thallus scurfy, containing a *Trentepohlia* photobiont; ascomata black, to 0.25 mm wide; hypothecium colourless to pale brownish; epihymenium dark brown, K+ olivaceous; hymenial gel and asci I–, KI–; ascospores 3-septate, fusiform-ellipsoid, non-macrocephalic, 10–12.5 (–14) × 3–4 µm.

Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 324/15 (HO).

Arthonia sp. B

On the decorticated, dry, bleached wood of a dead standing tree, associated with calicioid species and *Schismatomma rediunta*. This remarkable species has the following diagnostic characters: thallus inapparent, containing no substances detectable by t.l.c.; photobiont *Trentepohlia*; ascomata lirelliform, to c. 1 mm long and 0.2 mm wide, with tapered ends, sunken between and following the fibres of the wood substratum, black, mostly with a light, pale grey pruina; hypothecium colourless; epihymenium granular, olivaceous, intensifying olive in K; hymenium strongly KI+ blue; asci lacking any discernible amyloid structures; ascospores 3 (–4)-septate, macrocephalic, 16.5–20 × 5.5–8 µm.

The old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 30 m alt., 2015, *G. Kantvilas* 488/15 (HO).

[5]*Aspicilia caesiocinerea* (Nyl. ex Malbr.) Arnold

On non-calcareous rocks, especially near the coast. Although often with abundant apothecia, only one Kangaroo Island specimen has any fertile asci, but all nevertheless display the diagnostic characters of a grey, continuous, areolate or sometimes rather lumpy thallus containing aspicilin, and conidia 6–9 × 1 µm. Supported by DNA-sequence data, this taxon has been transferred to the genus *Circinaria* (Nordin *et al.* 2010).

Northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2009, *G. Kantvilas* 364/09 (HO); same locality, 2015, *G. Kantvilas* 477/15 (AD, HO); Ironstone Hills, 35°43'S 137°58'E, 90 m alt., 2011, *G. Kantvilas* 312/11 (AD, HO); Windmill Bay, 35°51'S 138°07'E, 10 m alt., 2011, *G. Kantvilas* 413/11 (HO); Western River Cove, W end of beach, 35°40'S 136°58'E, 2 m alt., 2015, *G. Kantvilas* 414/15 *& B. de Villiers* (HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 539/15 (HO).

Aspicilia contorta (Hoffm.) Ach.

On limestone in heathland or rough pasture near the coast. The specimens studied are characterised by a thallus of whitish, well-separated, rather knobbly papillae and/or apothecia with a prominent, inrolled margin, an inconspicuous or absent prothallus, and contain aspicilin. Although apothecia are usually abundant, no ascospores were located; nor could conidia be observed. This species is included in the genus *Circinaria* by Nordin *et al.* (2010). **Fig. 16B.**

West Bay, 35°53'S 136°33'E, 3 m alt., 2011, *G. Kantvilas* 292/11 (HO); Ravine des Casoars, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 491/12 *& B. de Villiers* (AD, HO); Red House Bay, 35°49'S 138°06'E, 50 m alt., 2013, *G. Kantvilas* 312/13 (HO); c. 1.5 km SW of Point Ellen, 36°00'S 137°11'E, 10 m alt., 2015, *G. Kantvilas* 441/15 (AD, HO).

[a]*Aspicilia praecrenata* (Nyl.) Hue

The specimen cited could well be accommodated within a broad concept of the widespread calcicolous species, *A. contorta* (Hoffm.) Kremp., and I have seen similar specimens under that name in Australian

herbaria. However, I have elected to follow the account of Owe-Larsson *et al.* (2007) and apply the name *A. praecrenata* (based on a North American type), albeit with some hesitation. The specimen is terricolous, growing on calcareous soil with *Gyalolechia* and *Psora* species, has a rather lumpy, squamulose, white thallus containing aspicilin, prominent apothecia with a thick crenulate margin and a white-pruinose disc, well-developed 3-spored asci (contrary to all studied specimens of *A. contorta*) and subglobose ascospores, 20–26 × 18–20 µm.

Near King George Beach, 35°39'S 137°07'E, 10 m alt., 2011, *G. Kantvilas* 336/11 *& B. de Villiers* (AD, HO, UPS).

Austroparmelina conlabrosa (Hale) A.Crespo, Divakar & Elix

Locally common on wood and bark in dry sclerophyll forest, *Melaleuca*-dominated woodland and mallee; rarely also on rock. Recognised by the tightly adnate, grey, foliose thallus with dense isidia, the C+ red medulla and the black underside. **Illustration:** Kantvilas *et al.* (2002: 118).

Flinders Chase area, 1955, *J.B. Cleland s.n.* (AD); Waterfall Creek, Western River Conservation Park, 35°42'S 136°54'E, 1982, *K. Stove* 1742 (AD); Lashmar Lagoon, 35°49'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 266/11 *& B. de Villiers* (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 570/12, 755/12 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 345/13 *& B. de Villiers* (AD, HO); Ironstone Hills, 35°44'S 137°57'E, 70 m alt., 2015, *G. Kantvilas* 380/15 (HO); Rocky River near bridge on West Bay Road, 35°56'S 136°37'E, 10 m alt., 2015, *G. Kantvilas* 519/15 (HO).

Austroparmelina pruinata (Müll.Arg.) A.Crespo, Divakar & Elix

Widespread and very common on twigs and young branches in eucalypt woodland, mallee and heathland. This is one of Kangaroo Island's most common macrolichens, recognised by the grey, foliose thallus, the C+ red medulla, the grey-pruinose apothecial disc and the black underside. **Fig. 17.**

Flinders Chase area, 1945, *J.B. Cleland s.n.* (AD); N of Murray Lagoon, 1972, *R.D. Seppelt* 2063 (MEL); Mt Taylor Conservation Park, 35°56'S 137°03'E, 1982, *E.N.S. Jackson* 4489 (AD); Cape Gantheaume Conservation Park, c. 2 km S of entrance, 36°00'S 137°36'E, 1982, *K. Stove* 1514 *p.p.* (AD); corner of Playford Hwy, Birchmore Hwy and road to Kingscote aerodrome, 35°42'S 137°31'E, 1982, *K. Stove* 1791 *p.p.* (AD); c. 0.75 km SE of Amen Corner, 35°41'S 137°13'E, 1982, *K. Stove* 1982 (AD); 13 km NE of Vivonne Bay, 35°35'S 137°16'E, 30 m alt., 1985, *J.A. Elix* 19581 *& L.H. Elix* (CANB); 3 km E of Seal Bay, 36°00'S 137°21'E, 30 m alt., 1985, *J.A. Elix* 19584, 19587A *& L.H. Elix* (CANB); S of Wisanger Hills, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19650 *& L.H. Elix* (CANB); Dudley Peninsula, 5 km W of Antechamber Bay, 35°45'S 138°01'E, 160 m alt., 1985, *J.A. Elix* 19684 *& L.H. Elix* (CANB); Harveys Return, 1985, *J.H. Willis s.n.* (MEL); 1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuehl s.n. p.p.* (MEL 1052177); adjacent to Eleanor River, 3 km E of Little Sahara sand dunes, 35°57'S 137°17'E, 1989, *D.N. Kraehenbuehl* 5177 (AD); c. 6 km N of Vivonne Bay, 35°56'S 137°11'E, 1989, *D.N. Kraehenbuehl* 5190 *p.p.* (AD); Creek Bay Farm, c. 3.5 km NW of Cape Willoughby, 35°49'S 138°07'E, 110 m alt., 2009, *G. Kantvilas* 366/09 (AD, HO); Cape Borda lighthouse cemetery, 35°45'S 136°38'E, 90 m alt., 2010, *G. Kantvilas* 190/10 (HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 1 m alt., 2010, *G. Kantvilas* 193/10 (HO); Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2010, *G. Kantvilas* 215/10 (AD, HO); Stars Road, 35°47'S 137°33'E, 65 m alt., 2012, *G. Kantvilas* 395/12 (HO); Hanson Bay Track, c. 1 km SW of Grassdale Lagoon, 36°00'S 136°52'E, 50 m alt., 2015, *G. Kantvilas* 299/15 *& B. de Villiers* (HO).

Fig. 17. *Austroparmelina pruinata*, one of the most common epiphytic macrolichens on the island. Scale = 5 mm. Photo: B. de Villiers.

Austroparmelina pseudorelicina (Jatta) A.Crespo, Divakar & Elix

On *Allocasuarina* bark in dry sclerophyll forest; apparently very uncommon on the island and highly localised. This grey, foliose species is distinguished from the preceding one chiefly by having a brownish, epruinose apothecial disc. **Illustration:** Kantvilas *et al.* (2002: 123).

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 572/12 *& B. de Villiers* (AD, HO).

Austroparmelina subarida (Elix) A.Crespo, Divakar & Elix

On the bark of twigs of understorey trees in dry sclerophyll forest; seemingly rare on the island. Differing from the superficially similar *A. pseudorelicina* by the pale underside.

Cape Borda lighthouse cemetery, 35°45'S 136°38'E, 90 m alt., 2010, *G. Kantvilas* 189/10 (AD, HO).

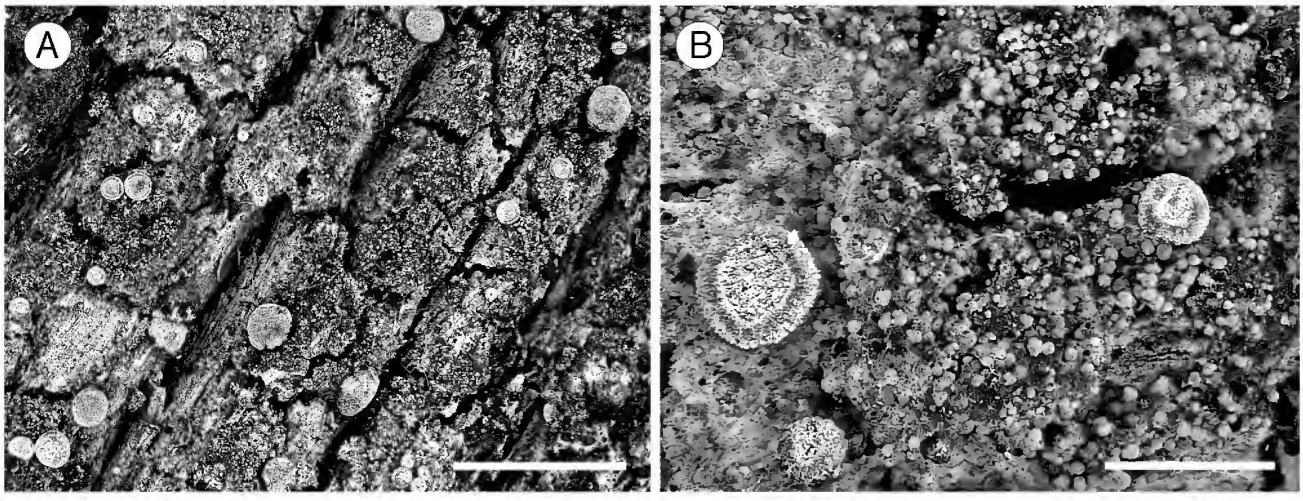

Fig. 18. *Bacidia brigitteae*. **A** Habit, showing the persistently pruinose apothecia. Scale = 5 mm. **B** Detail of the granular to goniocyst-like thallus. Scale = 1 mm. Photos: J. Jarman.

[T]*Bacidia brigitteae* Kantvilas

On soft bark of *Melaleuca* in coastal oldgrowth mallee and woodland, in close proximity to rivers and lagoons. Readily recognised by the greenish, granular thallus with densely pruinose apothecia, an excipulum inspersed with crystals, and the filiform ascospores, (43–) 50–77 (–80) × (2.5–) 3–4 µm, with 8–18 septa. Known only from Kangaroo Island. **Fig. 18.**

Ravine des Casoars, 35°48'S 136°37'E, 20 m alt., 1985, *J.A. Elix* 19734 *& L.H. Elix* (B, CANB); same locality, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 482/12 *& B. de Villiers* (AD, HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 326/15 *& B. de Villiers* (AD, HO) [type]; South West River, 36°01'S 136°52'E, 10 m alt., 2015, *G. Kantvilas* 426/15 *& B. de Villiers* (AD, HO).

[S]*Bacidia laurocerasi* (Delise ex Duby) Zahlbr.

On *Melaleuca* in swampy woodland. Characterised by the generally smooth crustose thallus, the dark-coloured to black apothecia with the epihymenium and outer part of the excipulum pigmented purple-brown, intensifying purple in K, the absence of greenish, N+ crimson pigments, the colourless hypothecium and by the acicular ascospores, 55–80 × 3–4 µm, with up to 17 septa. This name has been variously applied to Australasian specimens, but the KI collection compares favourably to reference material and descriptions from the Northern Hemisphere (Ekman 1996).

Murray Lagoon, Timber Creek, 35°55'S 137°26'E, 15 m alt., 2011, *G. Kantvilas* 347/11 *& B. de Villiers* (HO).

Bacidia littoralis Kantvilas

On sandstone in sheltered underhangs in dry sclerophyll forest. The apothecia of this widespread, southern Australian species are extremely variable, ranging from dark grey to grey-brown to black, with variable amounts of brown, K+ purple brown, and greenish, N+ crimson, pigments in the excipulum, hypothecium and epihymenium; ascospores are acicular to narrowly fusiform, 3–7-septate, 24–48 × 2–3.5 µm (Kantvilas 2018c). **Fig. 19A.**

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 785/12 (HO).

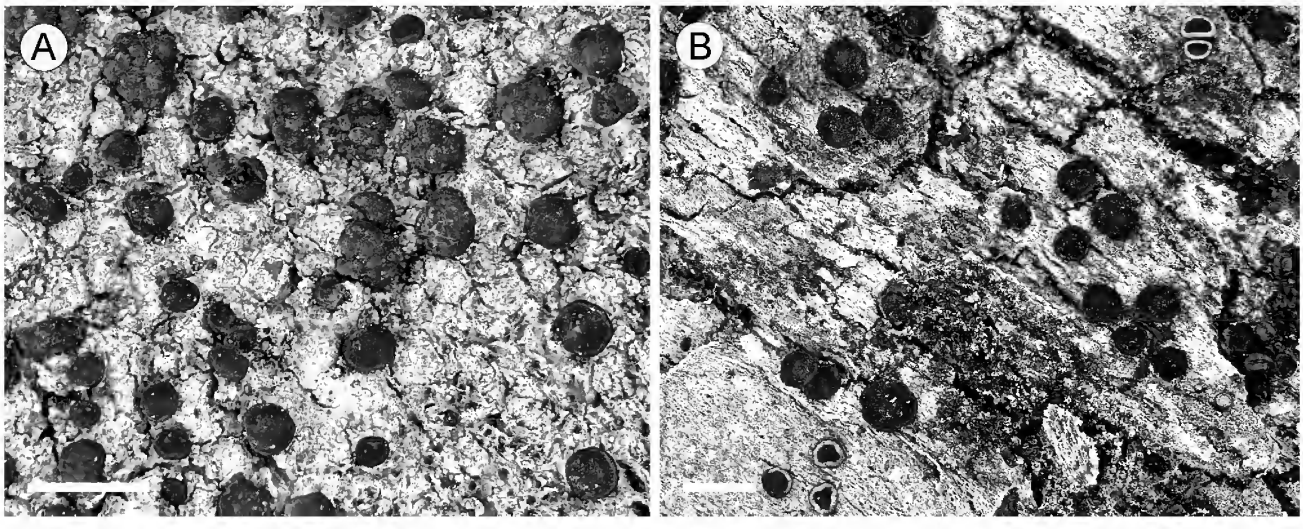

Fig. 19. A *Bacidia littoralis*. **B** *Bacidia septosior*. Scales = 2 mm. Photos: J. Jarman.

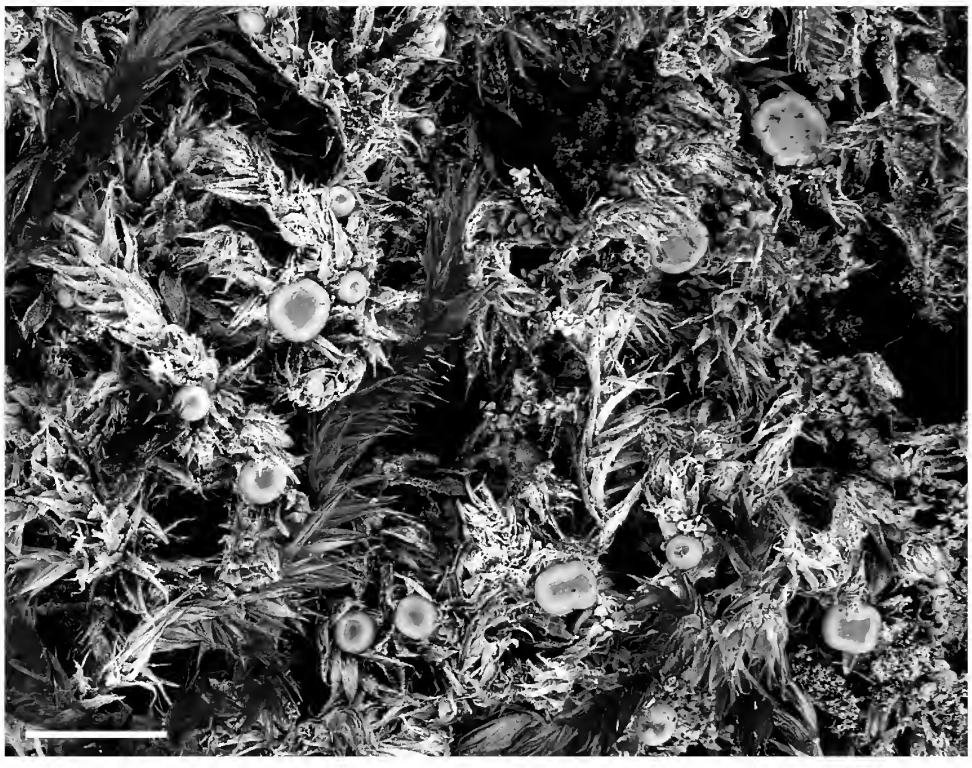

Fig. 20. This very rare species, collected from an old trunk of *Callitris*, is likely to represent an undescribed member of the *Bacidia rubella* (Hoffm.) A.Massal. group. Scale = 2 mm. Photo: J. Jarman.

***Bacidia rubella* (Hoffm.) A.Massal. aggr.**
Overgrowing bryophytes on a mature *Callitris* trunk in a relict coniferous woodland. The greyish, ± granular thallus, pale orange-pink, biatorine apothecia to 1 mm wide, internally pigmented yellow-orange, and the excipulum inspersed with granules and constructed of radiating hyphae that lack enlarged cells, suggest a relationship with the widespread *B. rubella* (Hoffm.) A.Massal. group. However, this remarkable species is distinguished by having ascospores that are 85–96 × 4–5.5 µm, with 30–40 septa; these are longer, wider and more septate than those of *B. rubella* (Ekman 1996) or its relatives (Llop *et al.* 2007). Superficially, this species resembles a species of *Coenogonium*. **Fig. 20.**

Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 438/12 *& B. de Villiers* (HO).

***Bacidia* cf. *schweinitzii* (Fr. ex E.Michener) A.Schneid.**
On moist *Melaleuca* bark in coastal woodland. Characterised by a rather reduced thallus of dispersed granules, dark brown to black apothecia to 1 mm diam., a green, N+ crimson epihymenium, a dark reddish brown hypothecium and excipulum, acicular, mostly 7-septate ascospores, 40–56 × 3 µm, and thread-like, curved conidia, 20–25 × 0.5 µm.

I hesitate to unequivocally determine this specimen as *B. schweinitzii*, first described from North America, because reference material of that taxon has a better developed thallus. Furthermore, in these reference specimens, the red-brown colour appears to be derived mainly from *rubella*-orange or *schweinitzii*-red pigments (after Ekman 1996) which intensify reddish in KOH. In the Kangaroo Island specimen, the brown colour is derived at least in part from *laurocerasi*-brown and reacts K+ purplish brown.

Ravine des Casoars, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 485/12 *& B. de Villiers* (HO).

***Bacidia septosior* (Nyl.) Zahlbr.**
Locally common in moister habitats in mallee woodland on spongy bark at the bases of older eucalypts, on larger *Melaleuca* trunks in coastal woodland, and on *Callitris*. This distinctive species is easily recognised by the jet-black apothecia that are commonly thickly whitish-pruinose or have the pruina confined to the edge of the excipulum; older, epruinose apothecia are superficially very similar to those of a *Megalaria*. Anatomically this species is characterised by a combination of an excipulum that is colourless within, inspersed with bands of angular crystals and with red-brown, K+ purple-brown pigment at the outer edge, a colourless to pale yellowish hypothecium, a grey-green, K+ greenish, N+ purple epihymenium, and filiform to narrowly cylindrical ascospores, 55–104 × 4–6 µm with 20–35 septa (Kantvilas 2017). **Fig. 19B.**

West Bay, 35°53'S 136°33'E, 40 m alt., 1994, *H.T. Lumbsch* 10915a, *A. Dickhäuser & H. Streimann* (CANB); Cape du Couedic Road, 1 km S of Rocky River Settlement, 35°57'S 136°44'E, 70 m alt., 1994, *H. Streimann* 54997 (AD, CANB); Willson River, 35°52'S 137°56'E, 1997, *R.J. Bates* 48365 (AD); Moffatt Road, 35°49'S 138°00'E, 70 m alt., 2011, *G. Kantvilas* 251/11 *& B. de Villiers* (HO); West Bay, 35°53'S 136°33'E, 10 m alt., 2011, *G. Kantvilas* 299/11 (AD, HO); Creek Bay Farm at headwaters of Lubra Creek, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 379/11 (AD, HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 435/12 *& B. de Villiers* (AD, HO); North Cape Road, 35°36'S 137°35'E, 5 m alt., 2013, *G. Kantvilas* 261/13 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 347/13 *& B. de Villiers* (AD, HO); South

West River, 36°01'S 136°52'E, 10 m alt., 2015, *G. Kantvilas* 423/15 (HO); Rocky River, 35°56'S 136°37'E, 10 m alt., 2015, *G. Kantvilas* 518/15 (HO).

[a]*Bacidia stenospora* C.Knight

On bark and wood in mallee woodland and dry sclerophyll forest. Characterised by the reddish brown, biatorine apothecia that contain no greenish or purple-brown pigments, and by the acicular ascospores, 43–62 × 2–3 µm, with 7–10 (–15) indistinct septa. The orange-brown pigment in the excipulum and hypothecium is *rubella*-orange (after Ekman 1996) and intensifies orange in K and N.

Approx. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 120 m alt., 2011, *G. Kantvilas* 291/11 *& B. de Villiers* (HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 343/15 (HO); Snake Lagoon carpark, 35°57'S 136°39'E, 70 m alt., 2015, *G. Kantvilas* 517/15 (HO).

Bacidia sp. A

The genus *Bacidia* is very poorly known in Australia, and several unidentified species have been recorded from the island. The following taxon is common on eucalypt bark in mallee. A diagnosis highlighting salient features follows.

Thallus whitish, smooth to rimose; apothecia biatorine, to 0.3–0.7 mm diam., black to brown-black, rarely very faintly greyish-pruinose. Hymenium colourless, 70–80 µm thick, with a dark red-brown to grey-brown, K± purplish brown epihymenium composed of the pigmented apices of the paraphyses. Hypothecium colourless, faintly yellowish in K. Excipulum red-brown, K± purplish brown at the outer edge, with the pigment increasingly dilute within. Ascospores spiralled in the ascus, acicular with rounded or acute apices, 30–45 × 2–3 µm, (5–) 7-septate. Conidia filiform, curved, 10–15 × 0.5 µm.

I have not been able to find a published name for this species. The apothecial pigmentation, in particular the absence of greenish, N+ crimson pigments, is similar to that of *B. laurocerasi*, which differs by having significantly longer, wider and more septate ascospores (see above). It may also be close to *B. heterochroa* (Müll.Arg.) Zahlbr., which has somewhat longer, wider and more septate ascospores (Ekman 1996). The pantropical *B. millegrana* (Taylor) Zahlbr. differs by having a more granular thallus and larger apothecia with a pale margin. Also similar is the Northern Hemisphere's *B. vermifera* (Nyl.) Th.Fr. with respect to pigmentation and ascospore morphology, but that species has bacilliform conidia.

Cape Gantheaume Conservation Park, c. 2 km S of entrance, 36°00'S 137°36'E, 1982, *K. Stove* 1514 *p.p.* (AD); Corner of Playford Hwy, Birchmore Hwy and road to Kingscote aerodrome, 35°42'S 137°31'E, 1982, *K. Stove* 1790, 1789 *p.p.* (AD); Playford Hwy, 1 km W of Kingscote Airport, 35°43'S 137°31'E, 1985, *J.A. Elix* 19565, 19572 *& L.H. Elix* (CANB); Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2010, *G. Kantvilas* 216/10 (AD, HO); Hog Bay Road, 35°46'S 137°37'E, 20 m alt., 2013, *G. Kantvilas* 208/13 (HO).

Bacidia sp. B

On *Exocarpos* in dry sclerophyll forest. Characterised by a thallus, apothecial pigments and ascospores that are identical to those of *B. septosior* (see above), but lacking pruina on the apothecia and crystalline inclusions in the excipulum.

Rocky River near bridge on West Bay Road, 35°56'S 136°37'E, 10 m alt., 2015, *G. Kantvilas* 521/15 (HO).

Bacidia sp. C

On twigs of *Leucopogon parviflorus* in coastal scrub. This species is characterised by the following: thallus poorly developed, areolate, dull olive; apothecia black, to 0.2 mm wide; excipulum dilutely pigmented brown, K+ purplish brown at the upper and outer edges, elsewhere colourless; hypothecium colourless; hymenium 40–45 µm thick, grey-green, N+ crimson in the upper part; paraphyses mostly with capitate apices to 4 µm wide; ascospores fusiform, sigmoid, with acute apices, 25–30 × 2–2.5 µm, 3–7-septate; conidia filiform, strongly curved, 8–10 × 0.5 µm.

Approx. 1.5 km SW of Point Ellen, 36°00'S 137°11'E, 10 m alt., 2015, *G. Kantvilas* 447/15 (HO).

Baculifera xylophila (Malme) Marbach

On the twigs of *Acacia*. Distinguished from superficially similar species of *Buellia sens. str.* (e.g. *B. dissa*) by the non-inspersed hymenium with an olive-brown, N+ dark grey epihymenium, 8-spored asci, ascospores 12–22 × 6–9 µm, bacilliform conidia and the absence of substances detectable by t.l.c. (Elix & Kantvilas 2014).

Ravine des Casoars, 35°48'S 136°37'E, 70 m alt., 1994, *H.T. Lumbsch* 10906b, *A. Dickhäuser & H. Streimann* (CANB).

Baglietoa baldensis (A.Massal.) Vězda

On limestone near the coast in pasture and open woodland. Distinguished from other endolithic species of the Verrucariaceae with tiny, immersed perithecia by having a radially fissured perithecial apex.

Kirkpatrick Point, N of Remarkable Rocks, 36°02'S 136°45'E, 40 m alt., 1985, *J.A. Elix* 19616 *& L.H. Elix* (CANB); near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 284/13A (HO); Kelly Hill Conservation Park, c. 1 km SSW of Kelly Hill Caves, 36°00'S 136°54'E, 40 m alt., 2015, *G. Kantvilas* 359/15 (HO).

[s]*Bryobilimbia australis* (Kantvilas & Messuti) Fryday, Printzen & S.Ekman

On soil in gaps in mallee woodland. When first described, this species was perceived to be restricted mainly to cool, moist habitats at high elevations in Tasmania, south-eastern Australia and elsewhere at austral latitudes (Kantvilas *et al.* 2005). It has since been found commonly in lowland, dry sclerophyll habitats in Tasmania. Although somewhat atypical, the Kangaroo Island specimen displays the diagnostic features of the soon-immarginate, black apothecia with *Porpidia*-type asci and 0 (–1)-septate ascospores, 7–11 × 3.5–5 µm; the characteristic K+ blue-green pigment is very sparse

but can be observed in the hypothecium. **Illustration:** Kantvilas *et al.* (2005: Figs 1, 2A).

Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2013, *G. Kantvilas* 229/13 *& B. de Villiers* (HO, MSC).

Buellia aeruginosa A.Nordin, Owe-Larsson & Elix

Widespread and locally common on non-calcareous rocks on or near the coast. This faintly yellowish species is distinguished from the many other species of *Buellia* by its muriform ascospores, in combination with an aeruginose epihymenium. Contrary to the original description of Nordin *et al.* (1999), the ascospores of this species can be as large as 14–24 × 7–12 µm. **Fig. 21A.**

Stokes Bay, 35°37'S 137°12'E, 2 m alt.,1985, *J.A. Elix* 19658, 19659, 19660 *& L.H. Elix* (CANB); Cape St Albans, 35°48'S 138°08'E, 40 m alt., 2011, *G. Kantvilas* 363/11 (AD, HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 393/11 (AD, HO); Windmill Bay, 35°51'S 138°07'E, 10 m alt., 2011, *G. Kantvilas* 415/11 (AD, HO); Point Ellen, 36°00'S 137°11'E, 2 m alt., 2012, *G. Kantvilas* 461/12 *& B. de Villiers* (AD, HO); Western River Cove, E of beach, 35°41'S 136°58'E, 5 m alt., 2015, *G. Kantvilas* 408/15 (HO).

Buellia aethalea (Ach.) Th.Fr.

On rocks. Best distinguished from the superficially similar and more common and widespread *B. homophylia* by containing norstictic acid only; the latter contains additional atranorin.

Scotts Cove lookout, 3 km E of Cape Borda, 35°46'S 136°37'E, 120 m alt.,1985, *J.A. Elix* 19724 *& L.H. Elix* (CANB, HO).

Buellia albula (Nyl.) Müll.Arg.

One of the most common lichens on limestone, particularly near the coast, and one of the main contributors to the chalky-white colour of this rock type. Separated from some other, superficially similar but less common species of *Buellia* and *Diplotomma* by the presence of norstictic acid (microscope sections of the thallus and apothecia yield red crystals with the addition of KOH), the brownish epihymenium and brown, 1-septate ascospores. **Fig. 21B.**

Old quarry at Kingscote [collector and date unknown] (MEL); northern coast (Mr K. Hall's property), 1971, *G. Jackson* 785 (AD); c. 0.5 km N of Cape Borda lighthouse carpark, 35°45'S 136°36'E, 1982, *K. Stove* 1731 (AD); Point Ellen, 36°00'S 137°11'E, 4 m alt., 1985, *J.A. Elix* 19598 *& L.H. Elix* (CANB); Kirkpatrick Point, N of Remarkable Rocks, 36°02'S 136°45'E, 40 m alt., 1985, *J.A. Elix* 19615 *& L.H. Elix* (CANB); Cape Du Couedic, 36°03'S 136°42'E, 80 m alt., 1985, *J.A. Elix* 19617 *& L.H. Elix* (CANB); Cape Borda, 35°45'S 136°35'E, 100 m alt., 1994, *H. Streimann* 54956A (CANB); track to Cape Gantheaume, 36°04'S 137°27'E, 2008, *G. Kantvilas* 322/08 (AD, HO); Cape St Albans, 35°48'S 138°07'E, 20 m alt., 2010, *G. Kantvilas* 170/10 (AD, HO); Cape Borda, 35°45'S 136°36'E, 120 m alt., 2010, *G. Kantvilas* 186/10 (AD, HO); Cape St Albans, 35°48'S 138°08'E, 40 m alt., 2011, *G. Kantvilas* 365/11 (AD, HO); Ravine des Casoars, 35°48'S 136°35'E, 5 m alt., 2012, *G. Kantvilas* 448/12 (AD, HO); Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 517/12 *& B. de Villiers* (AD, HO); near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 276/13 (HO); c. 1.5 km SW of Point Ellen, 36°00'S 137°11'E, 10 m alt., 2015, *G. Kantvilas* 440/15 (AD, HO); Rocky River Track, c. 1 km S of Snake Lagoon, 35°58'S 136°39'E, 50 m alt., 2015, *G. Kantvilas* 506/15 *& B. de Villiers* (AD, HO).

[s]*Buellia cranfieldii* Elix

On sandstone in dry sclerophyll forest. Distinguished from several superficially similar species (*B. aethalea*, *B. homophylia* and *B. stellulata*) with a whitish thallus and black, sessile, immersed to adnate apothecia by its chemistry, which consists of atranorin only.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 758/12 *& B. de Villiers* (AD, HO).

Buellia dissa (Stirt.) Zahlbr.

A common crustose epiphyte, mainly on twigs in woodland, mallee and heathland. Characterised by the presence of atranorin and diploicin, the inspersed hymenium, the 2-spored asci, and the brown, 1-septate ascospores, 22–42 × 10–16 µm, that have prominent subapical and septal wall thickenings.

Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2010, *G. Kantvilas* 217/10 (AD, HO); c. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 120 m alt., 2011, *G. Kantvilas* 286/11 *& B. de Villiers* (HO); Western Cove Road, 35°44'S 137°35'E, 2 m alt., 2011, *G. Kantvilas* 305/11 (HO); Lades Road, 35°52'S 137°30'E, 30 m alt., 2011, *G. Kantvilas* 321/11 (HO); Creek Bay Farm, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 373/11, 381/11 (AD, HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 432/12 *& B. de Villiers* (AD, HO); Strawbridge Point, 35°47'S 137°47'E, 5 m alt., 2012, *G. Kantvilas* 542/12 *& B. de Villiers* (HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 350/15 (AD, HO).

[T]*Buellia extenuatella* Elix & Kantvilas

On twigs of *Leucopogon* and *Myoporum* in coastal scrub. With its inapparent thallus, black, lecideine apothecia and *Buellia*-type ascospores, 11–19 × 5–8 µm, this species is superficially very similar to *Amandinea punctata*, from which it can be distinguished with certainty only by its bacilliform conidia, (3–) 4–6 × 0.5–1 µm. It has also been recorded from the southern Australian mainland. **Illustration:** Elix & Kantvilas (2013b: Fig. 4).

Track to Cape Gantheaume, 36°04'S 137°27'E, 2008, *G. Kantvilas* 323/08 (AD, CANB, HO) [type]; Point Ellen, 36°00'S 137°11'E, 3 m alt., 2013, *G. Kantvilas* 220/13 (HO).

Buellia halonia (Ach.) Tuck.

Very common on non-calcareous rocks, mainly along the coast. Recognised by the yellowish, C+ orange, crustose thallus (containing isoarthothelin and roccellic acid), sessile, black, lecideine apothecia and *Physconia*-type ascospores, 11.5–19 × 6–9 µm. **Figs 21C, 22.**

Just E of Wisanger Park Homestead, 35°37'S 137°28'E, 80 m alt., 1985, *J.A. Elix* 19624 *& L.H. Elix* (CANB); mouth of De Mole River, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55064, 55077 (AD, CANB); Cape St Albans,

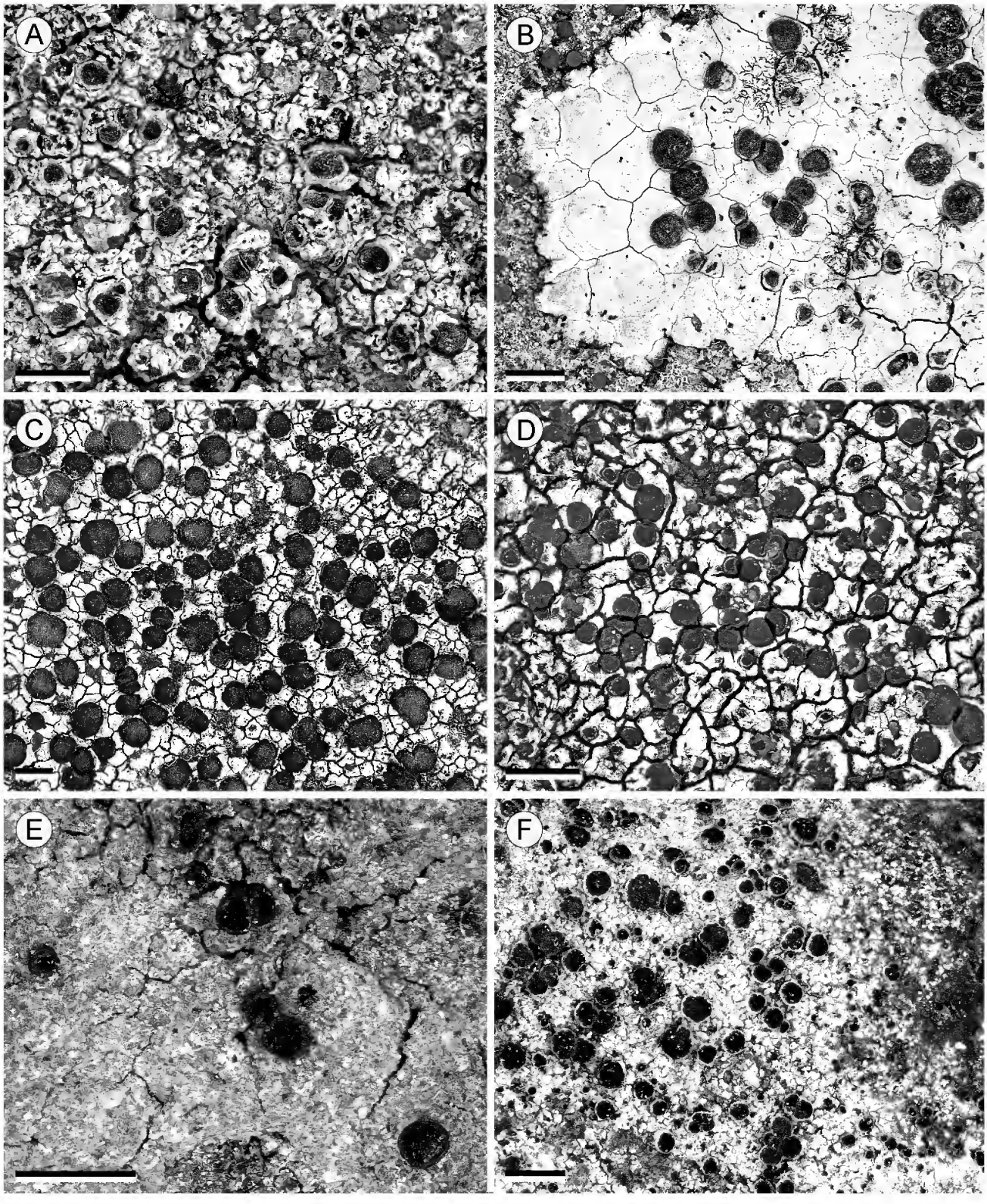

Fig. 21. A *Buellia aeruginosa*. **B** *Buellia albula*. **C** *Buellia halonia*. **D** *Buellia homophylia*. **E** *Buellia subadjuncta* (with black apothecia, growing as a parasite on the orange thallus of *Caloplaca lateritia*). **F** *Byssoloma subdiscordans*. Scales = 1 mm. Photos: J. Jarman.

35°48'S 138°07'E, 20 m alt., 2010, *G. Kantvilas* 173/10 (AD, HO); near King George Beach, 35°39'S 137°07'E, 2 m alt., 2011, *G. Kantvilas* 327/11 (AD, HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 392/11 (HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 323/13, 331/13 *& B. de Villiers* (AD, HO).

Buellia halonioides Elix

Occasional on rocks in dry sclerophyll forest. Superficially very similar to the preceding species and best distinguished chemically in that it contains arthothelin as the major constituent and medullary calcium oxalate; the latter is detected in squash preparations of the medulla by forming clusters of

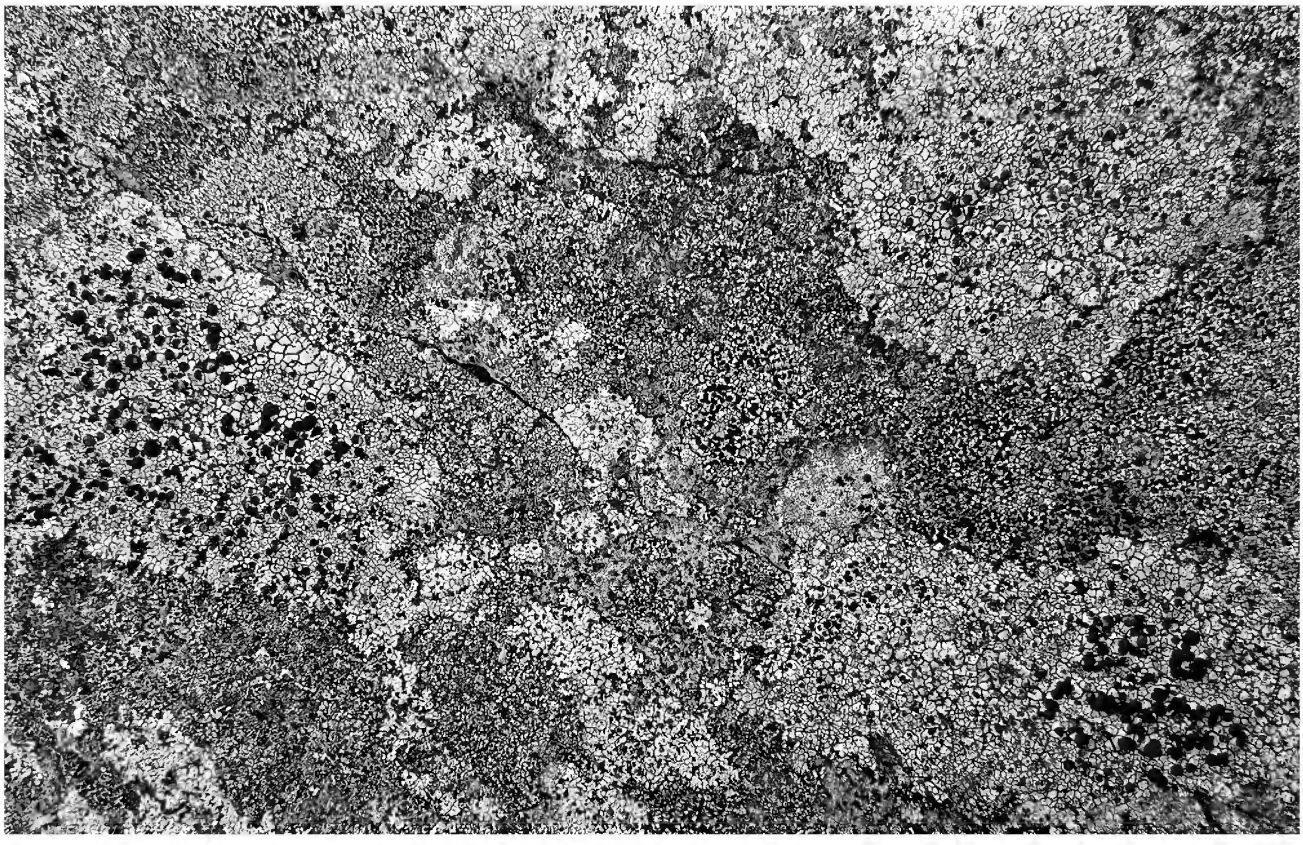

Fig. 22. Pale cream thalli of *Buellia halonia* form a mosaic with other crustose lichens on coastal rocks.

needle-like crystals with the addition of 10% sulphuric acid (Elix *et al.* 2017).

Mouth of De Mole River, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55072, 55079 (CANB, HO).

Buellia homophylia (C.Knight) Zahlbr.

On non-calcareous rocks, especially near the coast. This species, with a whitish, crustose thallus and black, adnate to immersed apothecia, is best characterised by its chemistry that comprises atranorin, norstictic and connorstictic acids. **Fig. 21D.**

Scotts Cove Lookout, 35°46'S 136°37'E, 120 m alt., 1985, *J.A. Elix* 19715 *& L.H. Elix* (CANB, HO); Ravine des Casoars, 35°48'S 136°37'E, 70 m alt., 1994, *H. Streimann* 54961 (CANB); Western River Road near Cove, 20 m alt., 1994, *H. Streimann* 54965 (CANB); mouth of De Mole River, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55094 (CANB); Cape St Albans, 35°48'S 138°07'E, 1 m alt., 2011, *G. Kantvilas* 368/11 (HO); c. 3.5 km NE of Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 533/12 *& B. de Villiers* (AD, HO); Ironstone Hills, 35°44'S 137°57'E, 70 m alt., 2015, *G. Kantvilas* 378/15 (AD, HO); Cape St Albans, 35°48'S 138°07'E, 40 m alt., 2015, *G. Kantvilas* 392/15 (AD, HO).

Buellia stellulata (Taylor) Mudd var. *stellulata*

On non-calcareous rocks near the coast. This variety is characterised by containing atranorin together with confluentic acid and/or 2'-*O*-methylperlatolic acid; var. *tasmanica* Elix & Kantvilas differs by containing atranorin and roccellic acid. Both varieties could be expected to occur on Kangaroo Island.

Cape St Albans, 35°48'S 138°07'E, 1 m alt., 2011, *G. Kantvilas* 368/11A (AD, HO); Windmill Bay, 35°51'S 138°07'E, 10 m alt., 2011, *G. Kantvilas* 414/11 (AD, HO); northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2013, *G. Kantvilas* 268/13 (HO); Western River Cove, E of beach, 35°41'S 136°58'E, 20 m alt., 2015, *G. Kantvilas* 406/15 (HO); shoreline of Eastern Cove, c. 2.5 km NE of American River, 35°46'S 137°47'E, 2 m alt., 2015, *G. Kantvilas* 489/15 (AD, HO).

[T]*Buellia subadjuncta* Elix & Kantvilas

This remarkable species grows as a parasite on the thallus and prothallus of *Caloplaca lateritia*, and is visible as tiny, black apothecia scattered on the orange-coloured host (Elix *et al.* 2017). It was first collected from a large boulder in a grassy, coastal shrubland. More recently it has been reported from New Zealand (Elix & Mayrhofer 2018). **Fig. 21E.**

Cape St Albans, 35°48'S 138°07'E, 40 m alt., 2015, *G. Kantvilas* 398/15 (HO) [type].

[S]*Buellia subarenaria* Müll.Arg.

On sandstone in dry sclerophyll forest. Characterised by a yellowish to yellowish brown thallus containing atranorin (±) and xanthones (C+ yellow-orange) and *Physconia*- to *Buellia*-type ascospores, 11–17 × 6.5–9 µm. The species appears to be uncommon on Kangaroo Island, and the single specimen seen is extremely small.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 753/12 *& B. de Villiers* (HO).

Buellia xantholeuca Bungartz & U.Grube

Locally abundant on limestone, especially near the coast. This species is superficially similar to and grows intermixed with *B. albula*, from which it can be distinguished by its pale yellowish cream thallus that contains xanthones (C+ orange); in contrast, *B. albula* is chalky white and contains norstictic acid (K+ yellow→red, C–).

Cape St Albans, 35°48'S 138°08'E, 40 m alt., 2011, *G. Kantvilas* 360/11 (HO); Windmill Bay, 35°51'S 138°07'E, 20 m alt., 2012, *G. Kantvilas* 470/12 (AD, HO); same locality, 2013, *G. Kantvilas* 235/13 (HO); Cape Willoughby, 35°51'S 138°08'E, 10 m alt., 2013, *G. Kantvilas* 241/13 *& B. de Villiers* (AD, HO); Stokes Bay, 35°37'S 137°13'E, 60 m alt., 2013, *G. Kantvilas* 300/13 *& B. de Villiers* (HO).

[s]*Byssoloma subdiscordans* (Nyl.) P.James

On sandstone outcrops in dry sclerophyll forest. This cosmopolitan species can occur on living leaves, bark or rock in moist habitats (Lücking 2008). The Kangaroo Island record is very unusual in that it was found in a dry, exposed microhabitat in a generally low rainfall area. Nevertheless, it conforms to published accounts and reference material of this species (P.M. McCarthy, pers. comm.): thallus grey-green, verruculose, forming discrete roundish patches, 10–15 mm wide, that sometimes coalesce, surrounded by a distinct, effuse, greyish green marginal prothallus; apothecia 0.2–0.8 mm diam., with disc black and margin minutely byssoid, grey and very thin; ascospores 3-septate, 12–17 × 3.5–5 µm; conidia pear-shaped, 4–5.5 µm long, to 1 µm wide at the distal end and to 2 µm wide at the proximal end; containing 2,5,7-trichloro-3-*O*-methylnorlichexanthone and 5,7-dichloro-3-*O*-methylnorlichexanthone (both major) with traces of additional xanthones. The apothecial margin of the Kangaroo Island collection is rather more compact than usual for this species and the specimen is superficially very similar to *B. adspersum*, a saxicolous species that differs by having 5-septate ascospores (Malcolm & Vězda 1995). **Fig. 21F.**

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 563/12 (AD, HO).

Calicium abietinum Pers.

On dead eucalypt wood in mallee woodland and dry sclerophyll forest. Characterised by having an immersed, inconspicuous thallus, stalked apothecia, 0.5–1 mm tall, with an epruinose capitulum and 1-septate, brown or grey ascospores, 12.5–15 × 5.5–7 µm (see Tibell 1987). This is one of only very few 'pin-lichens' that have been recorded for the island. Such species can be expected to occur on the lignin of older dead trees or on split fence posts. **Fig. 23.**

Creek Bay Farm, headwaters of Lubra Creek, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 372/11 (AD, HO, UPS); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 769/12, 771/12 (AD, HO, UPS); Kelly Hill Conservation Park, c. 1 km SSW of Kelly Hill Caves, 36°00'S 136°54'E, 40 m alt., 2015, *G. Kantvilas* 354/15 *& B. de Villiers* (AD, HO); Hanson Bay Track, c. 1 km S of Grassdale Homestead, 36°00'S 136°52'E, 5 m alt., 2015, *G. Kantvilas* 360/15 *& B. de Villiers* (AD, HO, UPS).

[s]*Calicium salicinum* Pers.

On eucalypt wood in dry sclerophyll forest. Distinguished from the preceding species by the brown pruina on the lower side of the capitulum.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 770/12 (AD, HO, UPS).

Calicium tricolor F.Wilson

On eucalypt wood in dry sclerophyll forest. Distinguished from the other species recorded for the island by the white pruina on the lower side of the capitulum. The Kangaroo Island specimen is heavily infected by *Arthonia caliciae* (see above).

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 772/12 (HO, UPS).

[T]*Caloplaca aggregata* Kantvilas & S.Y.Kondr.

On limestone in rough, coastal pasture. This distinctive, yellow-orange species is recognised by its pulvinate thallus to 30 mm wide, dominated almost entirely by densely crowded, zeorine apothecia. Further distinguishing characters are the hymenium and subhymenium that are inspersed with oil droplets, the slender paraphyses, and relatively small ascospores, 9–14 × 4.5–6 µm. Kondratyuk *et al.* (2017a) transferred this species to the genus *Gintarasiella*, but their alternative generic classification of this and other species of *Caloplaca* is not followed in this paper (see Kantvilas 2016a). **Fig. 24A.**

Windmill Bay, 35°51'S 138°07'E, 20 m alt., 2012, *G. Kantvilas* 476/12 (HO, KW). [type]

Caloplaca bastowii S.Y.Kondr. & Kärnefelt

On coastal shrubs. Characterised by lecanorine apothecia with a thin, grey thalline margin and a brownish orange disc, slender paraphyses lacking oil vacuoles, and a hymenium heavily inspersed with oil droplets. On the basis of molecular data, Kondratyuk *et al.* (2014) transferred this species to the genus *Franwilsia*. **Fig. 24B.**

Point Ellen, 36°00'S 137°11'E, 3 m alt., 2013, *G. Kantvilas* 221/13 (AD, HO, KW).

Fig. 23. *Calicium abietinum*. Scale = 1 mm. Photo: J. Jarman.

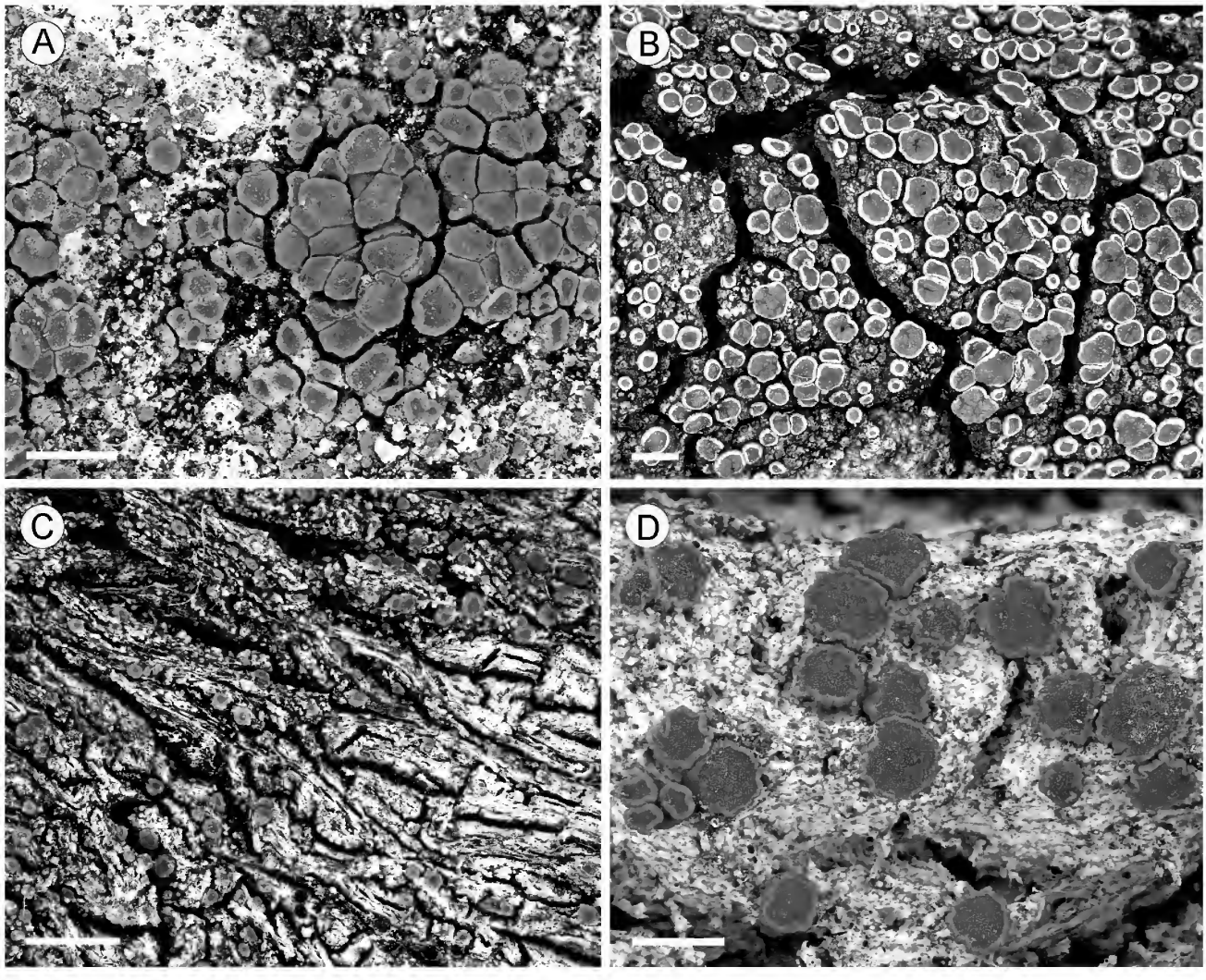

Fig. 24. A *Caloplaca aggregata*. **B** *Caloplaca bastowii*. **C** *Caloplaca cliffwetmorei*. **D** *Caloplaca dahlii*. Scales = 1 mm. Photos: J. Jarman.

Caloplaca brownlieae S.Y.Kondr., Elix & Kärnefelt

On exposed non-calcareous rocks in woodland. This species is characterised by a vivid orange-red, esorediate thallus composed of rather angular, contiguous, very tightly adnate areoles. The presence of gyrophoric acid is diagnostic. Chiefly on the basis of molecular data, it was transferred to the genus *Neobrownliella* by Kondratyuk *et al.* (2015).

Just S of Wisanger Hills Homestead, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19644 *& L.H. Elix* (CANB); Harveys Return, 1985, *J.H. Willis* (MEL); Ironstone Hills, near Harry Bates' cottage, 35°43'S 137°58'E, 90 m alt., 2011, *G. Kantvilas* 313/11 (AD, HO); Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 372/13 (AD, HO); Lathami Conservation Park, 35°38'S 137°14'E, 160 m alt., 2015, *G. Kantvilas* 290/15 *& B. de Villiers* (HO).

Caloplaca cliffwetmorei S.Y.Kondr. & Kärnefelt

On twigs of *Leucopogon* in coastal heathland. Characterised by an inconspicuous thallus with orange, biatorine apothecia, <0.5 mm diam., paraphyses with oil vacuoles in chains, and ascospores that are 10–13 × 4–6 µm, with a prominent septum 3–5 µm wide. **Fig. 24C.**

Ravine des Casoars, at the coast, 35°48'S 136°35'E, 5 m alt., 2012, *G. Kantvilas* 446/12 (AD, HO, KW).

Caloplaca cranfieldii S.Y.Kondr. & Kärnefelt

Mostly in nutrient-enriched sites near bird rookeries, on bird perch rocks or near sheep pasture. Recognised by the development of yellow soredia and blastidia from the eroding upper surface and margins of the thallus areoles. On the basis of molecular data, Arup *et al.* (2013) transferred this and several limestone-inhabiting species to the genus *Flavoplaca*.

Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 520/12 *& B. de Villiers* (AD, HO, KW); northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2013, *G. Kantvilas* 269/13 (HO); Ironstone Hills, 35°44'S 137°57'E, 70 m alt., 2015, *G. Kantvilas* 376/15 (AD, HO); Western River Cove, E of beach, 35°41'S 136°58'E, 20 m alt., 2015, *G. Kantvilas* 412/15 (AD, HO, KW).

Caloplaca dahlii Elix, S.Y.Kondr. & Kärnefelt

This is the most widespread, conspicuous and distinctive epiphytic species of *Caloplaca* recorded for the island, and is found on twigs and small branches in heathland, woodland and mallee. Characterised by the glaucous grey to beige-brown thallus containing

lichexanthone, and the bright orange, biatorine apothecia to 1.5 mm wide, usually with a deeply lobed margin and sometimes slightly pruinose disc. Chiefly on the basis of molecular data, Kondratyuk *et al.* (2014) transferred this species to the genus *Eilifdahlia*. **Fig. 24D.**

N of Murray Lagoon, 1972, *R.D. Seppelt* 2064 (MEL); Bunker Hill, 36°00'40"S 136°44'10"E, 1982, *K. Stove* 1607 (AD); Playford Hwy, 1 km W of Kingscote Airport, 35°43'S 137°31'S, 15 m alt., 1985, *J.A. Elix* 19562 *& L.H. Elix* (CANB); S of Wisanger Hills Homestead, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19657 *& L.H. Elix* (CANB); 4 km W of Cape Willoughby, 35°50'S 138°05'E, 100 m alt., 1985, *J.A. Elix* 19705 *& L.H. Elix* (CANB); Bay of Shoals, 35°37'S 137°36'E, 2 m alt., 1985, *J.A. Elix* 19759 *& L.H. Elix* (CANB); adjacent to American River aerodrome, 35°46'S 137°46'E, 1986, *D.N. Kraehenbuehl s.n. p.p.* (MEL); 1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuehl s.n.* (MEL); adjacent to Eleanor River, 35°57'S 137°17'E, 1989, *D.N. Kraehenbuehl* 5176 (AD); Brown Beach, 35°48'S 137°50'E, 2007, *R.W. Rogers* 15516 (BRI); Red Banks, 35°45'S 137°43'E, 2008, *G. Kantvilas* 326/08 (AD, HO); Antechamber Bay, 35°49'S 138°05'E, 50 m alt., 2010, *G. Kantvilas* 197/10 (HO); c. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 100 m alt., 2010, *G. Kantvilas* 199/10 (AD, HO); Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2010, *G. Kantvilas* 211/10 (AD, HO); Nepean Bay, 35°44'S 137°36'E, 2 m alt., 2011, *G. Kantvilas* 316/11 (AD, HO, KW); Murray Lagoon, Timber Creek, 35°55'S 137°26'E, 15 m alt., 2011, *G. Kantvilas* 343/11 *& B. de Villiers* (AD, HO, KW); Creek Bay Farm, headwaters of Lubra Creek, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 386/11 (AD, HO, KW); Stars Road, 35°47'S 137°33'E, 65 m alt., 2012, *G. Kantvilas* 396/12 (HO); Pelican Lagoon, 35°49'S 137°48'E, 10 m alt., 2012, *G. Kantvilas* 406/12 *& B. de Villiers* (HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 417/12 *& B. de Villiers* (AD, HO); Hog Bay Road, 35°46'S 137°37'E, 20 m alt., 2013, *G. Kantvilas* 207/13 (AD, HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 320/15 *& B. de Villiers* (AD, HO).

Caloplaca eos S.Y.Kondr. & Kärnefelt

Forming extensive patches on coastal rocks, especially granite. Its yellow-orange to bright orange, areolate thallus, in which the marginal areoles are elongate, rounded and minutely effigurate, separate it from *C. tomareeana*, which has radiating, plicate, marginal lobes and stronger yellowish tones, and from *C. gallowayi*, which differs by being areolate and cracked, reddish, and with no hint of a lobed thallus margin. Arup *et al.* (2013) transferred this species and several other Southern Hemisphere littoral taxa to the genus *Sirenophila*, although that classification is not adopted here.

Remarkable Rocks, 1975, *C.R. Twidale s.n.* (AD, HO); Stokes Bay, 35°37'S 137°12'E, 2 m alt., 1985, *J.A. Elix* 19663 *& L.H. Elix* (CANB); Remarkable Rocks, 36°03'S 136°45'E, 40 m alt., 1994, *H.T. Lumbsch* 10913d, *A. Dickhäuser & H. Streimann* (CANB); Point Ellen, 36°00'S 137°10'E, 10 m alt., 2007, *R.W. Rogers* 15518B (BRI); Windmill Bay, 35°51'S 138°07'E, 2 m alt., 2011, *G. Kantvilas* 407/11 (AD, HO, KW); same locality, 2013, *G. Kantvilas* 237/13 *& B. de Villiers* (HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 1 m alt., 2011, *G. Kantvilas* 389/11 (AD, HO, KW); Point Ellen, 36°00'S 137°11'E, 2 m alt., 2012, *G. Kantvilas* 463/12 *& B. de Villiers* (AD, HO, KW); Cape St Albans, 35°48'S 138°07'E, 2 m alt., 2013, *G. Kantvilas* 212/13 *& B. de Villiers* (HO).

Caloplaca erythrosticta (Taylor) Zahlbr.

On wood. Characterised by the subsquamulose, scattered or contiguous, brownish orange areoles that become coarsely granular sorediate. The single specimen from Kangaroo Island is sterile.

[Rocky River area], 1940, *J.B. Cleland s.n.* (AD, HO).

Caloplaca ferdinandmuelleri S.Y.Kondr. & Kärnefelt

On sandstone in mallee woodland. Characterised by a sorediate, brownish orange, squamulose thallus and biatorine to zeorine apothecia. This species appears to be the sorediate counterpart of *C. rexfilsonii* (see below) and, like that species, is included in the genus *Filsoniana* by Kondratyuk *et al.* (2013).

Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 370/13 (AD, HO).

Caloplaca gallowayi S.Y.Kondr., Kärnefelt & Filson

On non-calcareous coastal rocks where, together with several other species of the genus, it is largely responsible for the extensive reddish coloration of the sea-shore; also found more rarely at inland locations. This species is included in the genus *Sirenophila* by Arup *et al.* (2013), whereas Kondratyuk *et al.* (2017a) classify it in *Elixjohnia*. **Fig. 25.**

[Rocky River area], 1940, *J.B. Cleland s.n.* (AD); Emu Bay, 35°35'S 137°31'E, 1957, *H.B.S. Wommersley* (AD); Remarkable Rocks, 36°03'S 136°45'E, 1972, *R.D. Seppelt* 916 (MEL); Harveys Return, 35°45'S 136°38'E, 2 m alt., 1985, *J.A. Elix* 19741 *& L.H. Elix* (CANB); mouth of De Mole River, 35°43'S 136°46'E, 20 m alt., 1994, *H.T. Lumbsch* 10922m, *A. Dickhäuser & H. Streimann* (CANB); Cape St Albans, 35°48'S 138°08'E, 40 m alt., 2011, *G. Kantvilas* 362/11 (AD, HO, KW); Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 512/12, 515/12 *& B. de Villiers* (AD, HO, KW); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 565/12 *& B. de Villiers* (AD, HO, KW).

T*Caloplaca gilfillaniorum* Kantvilas & S.Y.Kondr.

On wood in roughly cleared pasture and woodland. This tiny, easily overlooked species has minute, isidia-like thallus granules and biatorine to zeorine apothecia, 0.3–1 mm wide (Kantvilas & Kondratyuk 2013). Although known only from Kangaroo Island, its habitat suggests it should be more widely distributed. Kondratyuk *et al.* (2013) erected the genus *Kaernefia* for this species and the related *C. kaernefeltii* (see below). The relationship between these two species requires further study (Kantvilas 2016a). **Fig. 26A.**

Creek Bay Farm, 35°51'S 138°06'E, 100 m alt., 2011, *G. Kantvilas* 417/11 (AD, HO, KW) [type]; Creek Bay Farm, 35°50'S 138°06'E, 70 m alt., 2013, *G. Kantvilas* 225/13 (HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 333/15 *& B. de Villiers* (AD, HO, LD).

Fig. 25. *Caloplaca gallowayi*. This species is usually the dominant contributor to the orange-red zonation of the littoral zone.

Caloplaca holocarpa (Hoffm.) A.E.Wade

On nutrient-enriched rocks. Characterised by an inconspicuous thallus covered with tiny (0.1–0.25 mm wide), crowded, zeorine apothecia with a grey thalline margin and yellow-orange disc, and ascospores 9–14 × 5–8 µm, with the septum 3–4 µm wide. This species is classified in the genus *Athallia* by Arup *et al.* (2013).

Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 376/13 (HO, KW).

Caloplaca jackelixii S.Y.Kondr., Kärnefelt & A.Thell

On non-calcareous coastal rocks, intermixed with other species of *Caloplaca*, but seemingly preferring more sheltered sites such as small overhangs. It is best recognised by the rather waxy, deeply rimose-areolate thallus that is mottled yellowish, pale grey and greenish grey, sometimes in ± concentric zones, and the zeorine apothecia with a bright orange-yellow to orange-red disc. Kondratyuk *et al.* (2017a) include this species in the genus *Elixjohnia*. **Fig. 27.**

Cape St Albans, 35°48'S 138°07'E, 40 m alt., 2015, *G. Kantvilas* 399/15 (AD, HO, KW); shoreline of Eastern Cove, c. 2.5 km NE of American River, 35°46'S 137°47'E, 3 m alt., 2015, *G. Kantvilas* 491/15 (AD, HO, KW).

Caloplaca jerramungupensis S.Y.Kondr., Kärnefelt & Elix

On limestone in rough pasture. Characterised by an inconspicuous thallus and brownish orange, scattered, biatorine apothecia, with the hymenium and subhymenium densely inspersed with oil droplets, paraphyses with occasional oil vacuoles, and ascospores 14–18 × 6–9 µm. Kondratyuk *et al.* (2013) classify this species in the genus *Xanthocarpia*. **Fig. 26B.**

Cape St Albans, 35°48'S 138°08'E, 40 m alt., 2011, *G. Kantvilas* 359/11 (AD, HO, KW); Ravine des Casoars, at the coast, 35°48'S 136°35'E, 5 m alt., 2012, *G. Kantvilas* 454/12A (HO, KW); near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 286/13, 287/13 (HO); Stokes Bay, 35°37'S 137°13'E, 60 m alt., 2013, *G. Kantvilas* 299/13 *& B. de Villiers* (HO).

Caloplaca johnwhinrayi S.Y.Kondr. & Kärnefelt

On limestone in rough pasture. Characterised by a whitish, often indistinct thallus, soon zeorine apothecia with a whitish margin and bright orange to pink-orange disc, a non-inspersed hymenium, paraphyses with occasional oil vacuoles, and ascospores 12–15 × 4.5–7 µm. **Fig. 26C.**

Windmill Bay 35°51'S 138°07'E, 20 m alt., 2012, *G. Kantvilas* 475/12 (AD, HO, KW); Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 518/12 *& B. de Villiers* (AD, HO, KW); Cape Willoughby, 35°51'S 138°08'E, 10 m alt., 2013, *G. Kantvilas* 242/13 *& B. de Villiers* (HO).

Caloplaca kaernefeltii S.Y.Kondr., Elix & A.Thell

Epiphytic on moist bark in swampy woodland. This attractive species is recognised by its orange to orange-green, granular sorediate thallus and by the lecanorine apothecia to 1 (–2) mm wide, with a whitish thalline margin and orange to orange-pink disc. Kondratyuk *et al.* (2013) classify this species and the related *C. gilfillaniorum* in the genus *Kaernefia*. The relationship between these two species, at least on Kangaroo Island, requires further study (Kantvilas 2016a).

Chapman River, 35°48'S 138°04'E, 2 m alt., 2011, *G. Kantvilas* 371/11 *& B. de Villiers* (HO, KW); Ravine des Casoars, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 483/12 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 348/13 *& B. de Villiers* (AD, HO).

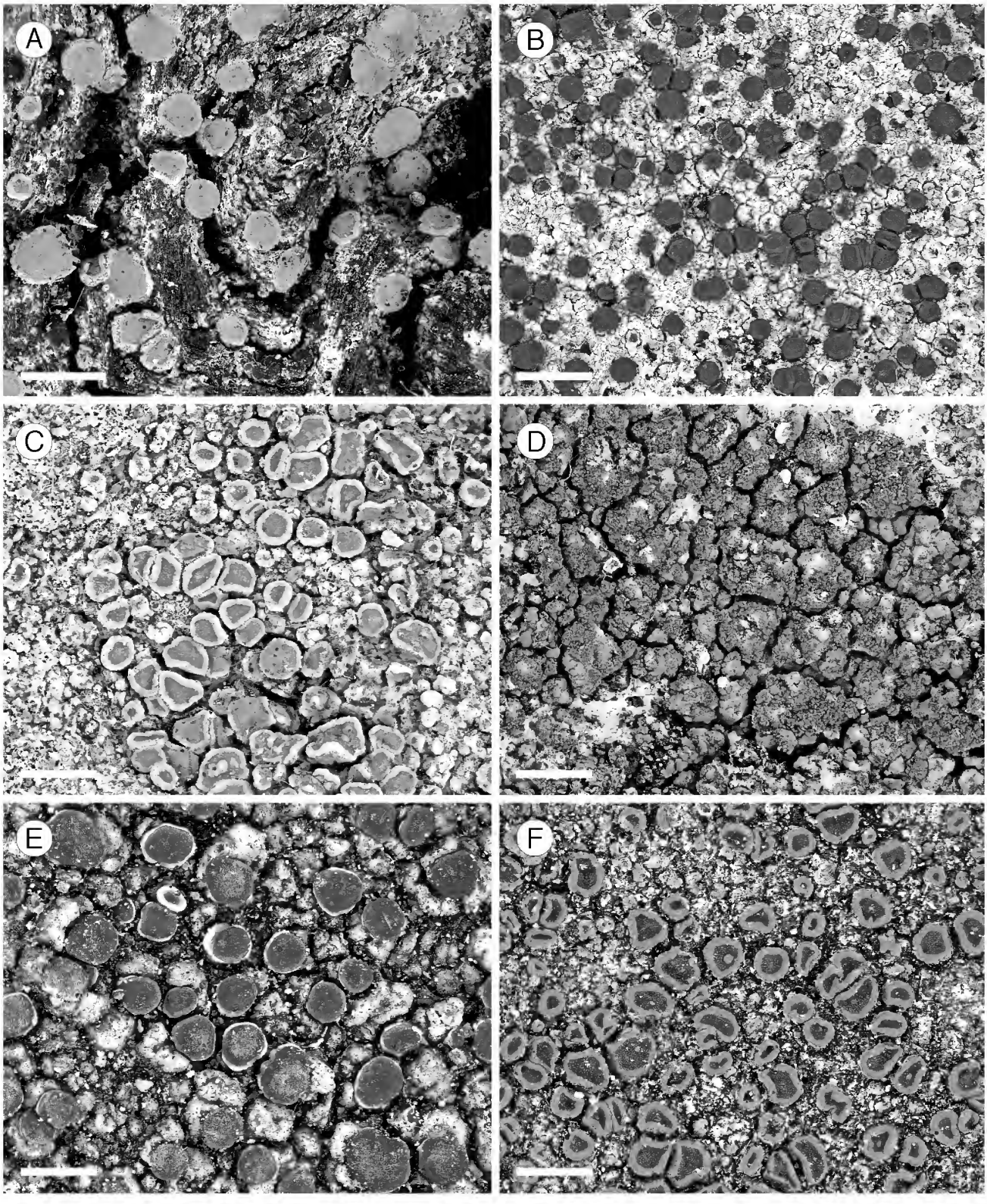

Fig. 26. A *Caloplaca gilfillaniorum*. **B** *Caloplaca jerramungupensis*. **C** *Caloplaca johnwhinrayi*. **D** *Caloplaca kantvilasii*. **E** *Caloplaca kilcundaensis*. **F** *Caloplaca lateritia*. Scales = 1 mm. Photos: J. Jarman.

Caloplaca kalbiorum S.Y.Kondr. & Kärnefelt

On the bark of an old *Leucopogon* shrub at the edge of an abandoned paddock. This species is unusual for a *Caloplaca* in that it has a sorediate thallus and black apothecia, and lacks any of the orange or yellow pigments characteristic of the genus. Chiefly on the basis of molecular data, it has been most recently classified in the genus *Streimanniella* by Kondratyuk *et al.* (2015).

Hanson Bay Track, c. 1 km S of Grassdale Homestead, 36°00'S 136°52'E, 5 m alt., 2015, *G. Kantvilas* 368/15 *& B. de Villiers* (AD, HO).

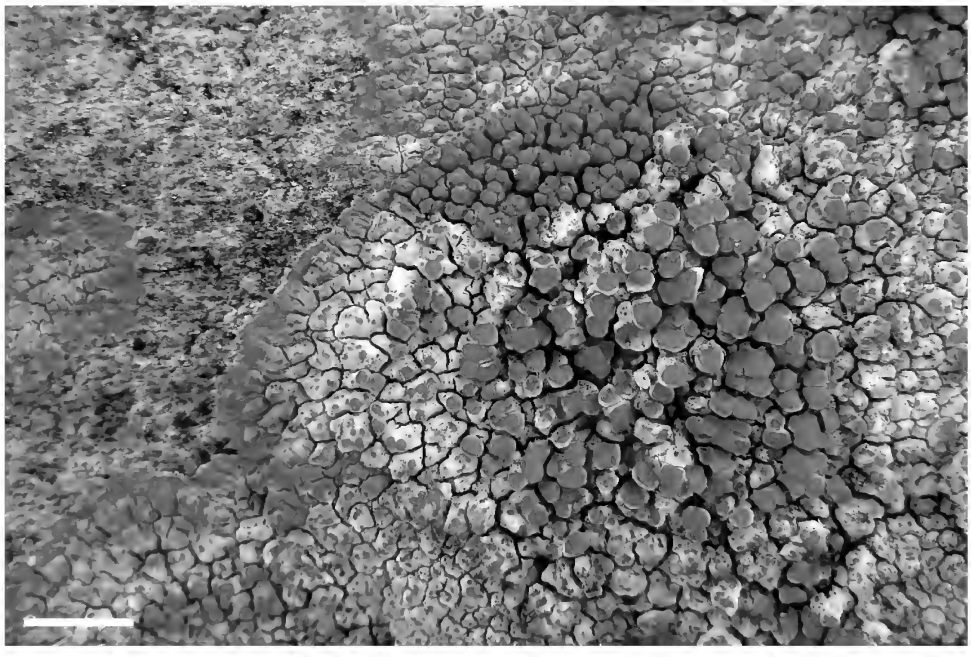

Fig. 27. *Caloplaca jackelixii*, showing the mottled orange, yellow and greyish thallus. Scale = 2 mm. Photo: B. de Villiers.

Caloplaca kantvilasii S.Y.Kondr. & Kärnefelt

On limestone outcrops in pasture. Recognised by the thick, convex areoles in which soredia and blastidia arise from the disintegration of the undersides of the margins. Arup *et al.* (2013) transferred this species to the genus *Flavoplaca*. **Fig. 26D.**

Windmill Bay, 35°51'S 138°07'E, 20 m alt., 2012, *G. Kantvilas* 472/12, 474/12A (HO, KW); Cape Willoughby, 35°51'S 138°08'E, 10 m alt., 2013, *G. Kantvilas* 246/13 *& B. de Villiers* (AD, HO, KW); North Cape area, 3 km N of Cape Rouge, 35°35'S 137°38'E, 10 m alt., 2013, *G. Kantvilas* 251/13 (AD, HO, KW); near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 288/13 (HO, KW).

Caloplaca kilcundaensis S.Y.Kondr. & Kärnefelt

On coastal rocks, usually in nutrient-enriched situations. Characterised by the rather thick, pale greyish brown thallus containing lichexanthone, dull, rusty orange-brown apothecia, usually with a thin, pale grey, thalline margin, a hymenium inspersed with oil droplets, slender paraphyses, and ascospores 11–18 × 5–7 µm. Kondratyuk *et al.* (2014) transferred this species to the genus *Franwilsia*. **Fig. 26E.**

Hog Bay, Penneshaw, 35°43'S 137°56'E, 2 m alt., 1985, *J.A. Elix* 19672 *& L.H. Elix* (CANB) [as *C. bastowii* S.Y.Kondr. & Kärnefelt]; Point Ellen, 36°00'S 137°11'E, 4 m alt., 1985, *J.A. Elix* 19598 *& L.H. Elix* (CANB); same locality, 2007, *R.W. Rogers* 15515 (BRI, HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 395/11 (AD, HO, KW); Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 519/12 *& B. de Villiers* (HO, KW); Western River Cove, summit of cliffs E of beach, 35°40'S 136°58'E, 50 m alt., 2015, *G. Kantvilas* 403/15 (AD, HO).

Caloplaca lateritia (Taylor) Zahlbr.

On non-calcareous rocks in rough pasture, heathland and dry sclerophyll forest. Characterised by a relatively inconspicuous thallus composed of scattered, orange-brown areoles, with orange-brown, biatorine apothecia, slender paraphyses lacking oil vacuoles, and ascospores 12–20 × 5.5–9.5 µm, with a relatively broad septum 3–5 µm wide. Variability in this species and its putative relatives are discussed by Kantvilas (2016a). Kondratyuk *et al.* (2017a) include this species in the genus *Nevilleiella*. **Fig. 26F.**

Approx. 2 km SW of Cape St Albans, 35°49'S 138°07'E, 60 m alt., 2011, *G. Kantvilas* 353/11, 354/11 (HO, KW); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 394/11A (HO); same locality, 2015, *G. Kantvilas* 479/15 (HO, KW); c. 3.5 km NE of Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 537/12 (HO, KW); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 759/12 *& B. de Villiers* (HO, KW); Penneshaw, foreshore near Frenchmans Rock, 35°43'S 137°57'E, 2 m alt., 2013, *G. Kantvilas* 197/13 (AD, HO, KW); Cape St Albans, 35°48'S 138°07'E, 40 m alt., 2015, *G. Kantvilas* 397/15 (AD, HO, KW).

Caloplaca maccarthyi S.Y.Kondr., Kärnefelt & Elix

On the bark and wood of shrubs in heathland and mallee. Characterised by a greyish thallus, tiny (<0.5 mm wide), often semi-immersed, lecanorine to zeorine apothecia with a usually yellow disc, paraphyses with scattered oil vacuoles, and ascospores 10–15 × 5–8 µm, with a relatively wide septum, 4–6 µm. Arup *et al.* (2013) classified this species together with several saxicolous littoral taxa in the genus *Sirenophila*.

1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuehl* (MEL); Cape St Albans, 35°48'S 138°07'E, 90 m alt., 2011, *G. Kantvilas* 357/11 (HO, KW); Creek Bay Farm, headwaters of Lubra Creek, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 388/11 (AD, HO, KW); W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 498/12 (HO, KW); northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2013, *G. Kantvilas* 274/13 (HO); Red House Bay, 35°49'S 138°06'E, 15 m alt., 2013, *G. Kantvilas* 321/13 (HO).

***Caloplaca mereschkowskiana* S.Y.Kondr. & Kärnefelt**
On limestone in coastal heathland and rough pasture. Characterised by an indistinct, whitish thallus, orange-yellow to reddish orange, biatorine apothecia, and relatively small ascospores, 9–13 × 5–7 µm. Arup *et al.* (2013) classify this taxon in the genus *Flavoplaca*.

Windmill Bay, 35°51'S 138°07'E, 20 m alt., 2012, *G. Kantvilas* 474/12 (AD, HO, KW); near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 289/13 (HO).

***Caloplaca montisfracti* S.Y.Kondr. & Kärnefelt**
In sheltered underhangs on rocks in rough pasture. This is a very distinctive species due to its small (to 1 cm wide), greyish pink to pale orange-pink thalli, with red apothecia sunken in the central parts of the thallus. It is classified in the genus *Neobrownliella* by Kondratyuk *et al.* (2015). **Fig. 28A.**

Approx. 2 km SW of Cape St Albans, 35°49'S 138°07'E, 60 m alt., 2011, *G. Kantvilas* 355/11 (AD, HO, KW).

T*Caloplaca piscatorica* Kantvilas & S.Y.Kondr.
On sea-shore rocks, mostly in more sheltered microhabitats; also collected in damp habitats away from the littoral zone. Recognised by the absence of a visible thallus and by the scattered, persistently biatorine, lemon-yellow apothecia that resemble those of a species of *Candelariella* (Kantvilas & Kondratyuk 2013). Known only from the island but probably more widespread. **Fig. 28B.**

Northern end of Antechamber Bay, 35°47'S 138°04'E, 2011, *G. Kantvilas* 489/11 (HO, LD, KW); same locality, 2012, *G. Kantvilas* 510/12 (AD, HO, KW) [type]; Ravine des Casoars, c. 0.5 km inland from coast, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 481/12 *& B. de Villiers* (AD, HO, KW).

***Caloplaca rexfilsonii* S.Y.Kondr. & Kärnefelt**
On coastal rocks; more rarely on consolidated soil. This species is characterised by a thallus of dispersed to contiguous, brownish orange squamules, biatorine to zeorine apothecia, a non-inspersed hymenium, slender paraphyses lacking oil vacuoles, and ascospores 12–18 × 6–9 µm, with a thick septum 2–6 µm wide. It is classified in the genus *Filsoniana* by Kondratyuk *et al.* (2013). **Fig. 28C.**

Northern end of Antechamber Bay, 35°47'S 138°04'E, 1 m alt., 2011, *G. Kantvilas* 394/11 (HO, KW); same locality, 35°46'S 138°04'E, 5 m alt., 2013, *G. Kantvilas* 266/13 (AD, HO); Cape St Albans, 35°48'S 138°07'E, 40 m alt., 2015, *G. Kantvilas* 396/15 (HO, KW); Lashmar Conservation Park, c. 2 km S of Cape Coutts, 35°47'S 138°04'E, 50 m alt., 2015, *G. Kantvilas* 428/15 *& B. de Villiers* (HO).

T*Caloplaca sergeyana* Kantvilas
On sandstone boulders in mallee woodland. Superficially very similar to the common corticolous species, *C. dahlii*, and likewise with biatorine, orange to orange-yellow apothecia. It differs chiefly by its substrate ecology, and by having a scurfy, poorly developed thallus that lacks lichexanthone (Kantvilas 2016a). Kondratyuk *et al.* (2017b) transferred this species to the genus *Eilifdahlia*. **Fig. 28D.**

Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 378/13 (HO, KW) [type].

***Caloplaca sublobulata* (Nyl.) Zahlbr.**
On coastal rocks. Distinguished from the orange species, *C. eos* and *C. gallowayi*, with which it grows, by the bright yellow, areolate, papillate to subfruticose thallus, typically surrounded by a yellow, spidery or effigurate prothallus. The application in Australasia of this name, based on a South American type, is discussed by Kantvilas (2016a). Kondratyuk *et al.* (2014) transferred this species to the genus *Gondwania*. **Fig. 28E.**

Stokes Bay, 35°37'S 137°12'E, 2 m alt., 1985, *J.A. Elix* 19662 *& L.H. Elix* (CANB) [as *C. conranii*]; Hog Bay, Penneshaw, 35°43'S 137°56'E, 2 m alt., 1985, *J.A. Elix* 19675 *& L.H. Elix* (CANB) [as *C. conranii*]; American River, 35°46'S 137°47'E, 2007, *R.W. Rogers* 15517 (BRI); Windmill Bay, 35°51'S 138°07'E, 2 m alt., 2011, *G. Kantvilas* 407/11A (HO); same locality, 2012, *G. Kantvilas* 495/12 (AD, HO, KW); Penneshaw foreshore near Frenchmans Rock, 35°43'S 137°57'E, 2 m alt., 2013, *G. Kantvilas* 198/13 (AD, HO, KW); Cape St Albans, 35°48'S 138°07'E, 2 m alt., 2013, *G. Kantvilas* 213/13 *& B. de Villiers* (AD, HO, KW); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 0.5 m alt., 2013, *G. Kantvilas* 340/13 *& B. de Villiers* (HO, KW).

***Caloplaca subluteoalba* S.Y.Kondr. & Kärnefelt**
On the bark and wood of shrubs in coastal heathland. Characterised by the inconspicuous to absent thallus, persistently biatorine, yellow to yellow-orange apothecia, and relatively small ascospores, 7.5–11 × 4–6 µm. Arup *et al.* (2013) classified this species in the genus *Cerothallia*.

W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 498/12A, 500/12 (HO, KW).

***Caloplaca tibellii* S.Y.Kondr. & Kärnefelt**
On bark in heathland. Characterised by the endophloeodal thallus with bright yellow, K+ purple soredia that occur in scattered, granular clusters, not unlike those of a species of *Candelariella* (which is K–). This species is discussed further by Kantvilas (2016a).

Cape Gantheaume Conservation Park, road to Bales Beach, 35°59'S 137°21'E, 1982, *K. Stove* 1524 (AD, HO); West Bay, 35°53'S 136°33'E, 40 m alt., 1994, *H.T. Lumbsch* 10920e, *A. Dickhäuser & H. Streimann* (CANB, HO); W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 498/12B (HO).

***Caloplaca tomareeana* S.Y.Kondr. & Kärnefelt**
On coastal rocks, especially granite. Easily recognised by the greenish yellow to yellowish orange, subfoliose-placodioid thallus with plicate, radiating, convex to plane marginal lobes that are 0.3–0.8 mm wide. Synonymy and alternative generic placements of this taxon in *Sirenophila* (Arup *et al.* 2013) and *Tarasginia* (Kondratyuk *et al.* 2015) are discussed by Kantvilas (2016a). **Fig. 29.**

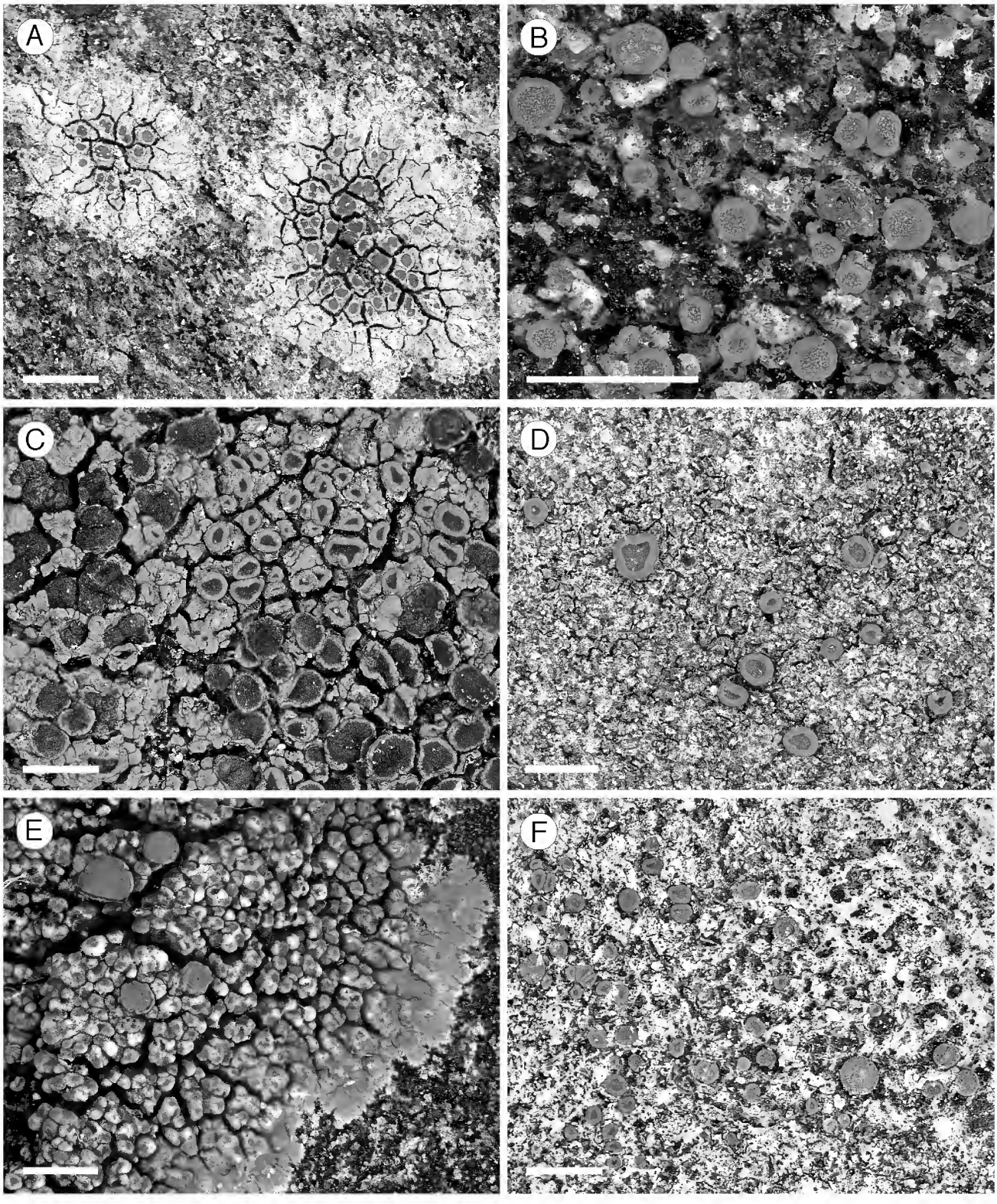

Fig. 28. A *Caloplaca montisfracti*. **B** *Caloplaca piscatorica*. **C** *Caloplaca rexfilsonii*. **D** *Caloplaca sergeyana*. **E** *Caloplaca sublobulata*. **F** *Caloplaca yorkensis*. Scales = 1 mm. Photos: J. Jarman.

Point Ellen, 36°00'S 137°10'E, 10 m alt., 2007, *R.W. Rogers* 15518A (BRI, HO); Point Ellen, 36°00'S 137°11'E, 2 m alt., 2012, *G. Kantvilas* 464/12, 462/12 *& B. de Villiers* (HO, KW); W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 506/12A, 507/12 (AD, HO, KW); Cape St Albans, 35°48'S 138°07'E, 2 m alt., 2013, *G. Kantvilas* 211/13 *& B. de Villiers* (AD, HO); Windmill Bay, 35°51'S 138°07'E, 0 m alt., 2013, *G. Kantvilas* 238/13 *& B. de Villiers* (AD, HO).

Caloplaca wilsonii S.Y.Kondr. & Kärnefelt

On eucalypt bark in dry sclerophyll forest; uncommon or overlooked. This species is easily recognised by the round, crater-like, yellowish soralia to c. 0.4 mm wide. In their new classification of the Teloschistaceae, Arup

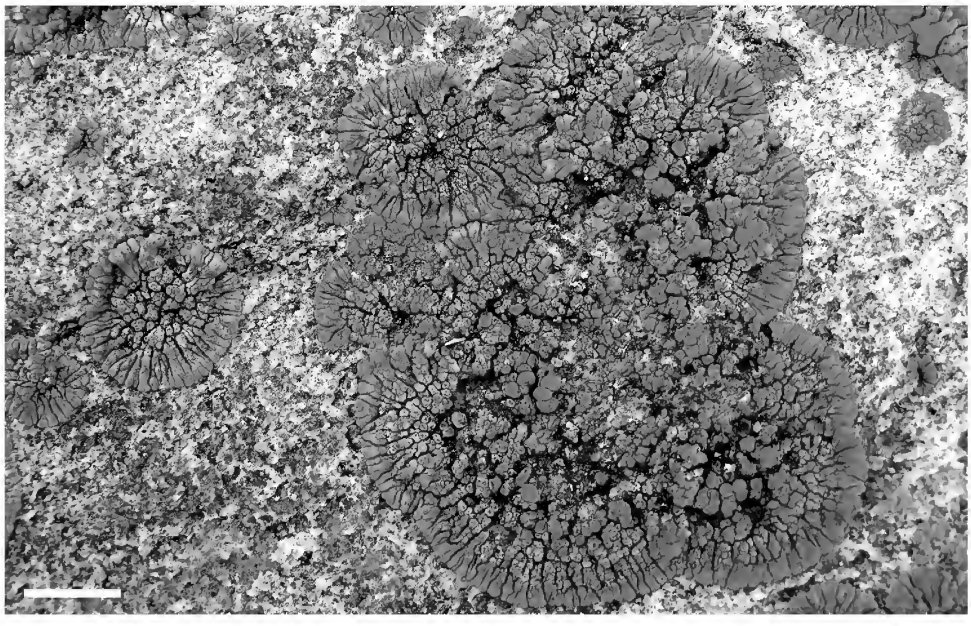

Fig. 29. *Caloplaca tomareeana*. Scale = 5 mm.

et al. (2013) introduce the name *Blastenia circumpolaris* Søchting *et al.* for this species.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 775/12 (HO).

Caloplaca yorkensis S.Y.Kondr. & Kärnefelt

On limestone in coastal heathland. Characterised by an inapparent thallus, yellow, biatorine apothecia, a non-inspersed hymenium, paraphyses that lack oil vacuoles, and relatively small ascospores, 8–11 × 3.5–5 µm. This species was placed in the genus *Cerothallia* by Arup *et al.* (2013). **Fig. 28F.**

Point Ellen, 36°00'S 137°11'E, 10 m alt., 2007, *R.W. Rogers* 15513 (BRI); Ravine des Casoars, at the coast, 35°48'S 136°35'E, 5 m alt., 2012, *G. Kantvilas* 454/12 (HO, KW); same locality, 5 m alt., 2012, *G. Kantvilas* 458/12 *& B. de Villiers* (AD, HO, KW); Windmill Bay 35°51'S 138°07'E, 20 m alt., 2012, *G. Kantvilas* 473/12 (AD, HO, KW).

Candelariella aurella (Hoffm.) Zahlbr.

On limestone outcrops in pasture. The bright yellow apothecia that react K–, and the asci with eight simple ascospores readily distinguish this lichen from similarly yellowish species of *Caloplaca* with which it usually occurs. **Illustration:** Brodo *et al.* (2001: Fig. 176).

Slopes above Red House Bay, 35°49'S 138°07'E, 50 m alt., 2012, *G. Kantvilas* 444/12 (HO).

Candelariella vitellina (Hoffm.) Müll.Arg.

On rocks, often in nutrient-enriched microhabitats. This is a vivid, egg-yolk yellow, crustose species, best characterised by its polysporous asci. **Illustration:** Brodo *et al.* (2001: Fig. 180).

Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 369/13 (HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2015, *G. Kantvilas* 480/15 (HO).

Candelariella xanthostigmoides (Müll.Arg.) R.W.Rogers

Widespread on wood and bark, especially on the trunks of understorey trees such as *Exocarpos* in woodland and mallee where its powdery, egg-yolk-coloured thallus can form an extensive and continuous cover. Apothecia with their diagnostic 8-spored asci are typically uncommon. Further study may well reveal that the older name, *C. reflexa* (Nyl.) Lettau, based on a European type, is applicable to Australian collections. **Fig. 30A.**

Approx. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 100 m alt., 2010, *G. Kantvilas* 201/10 (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 777/12 (HO); Creek Bay Farm, 35°50'S 138°05'E, 65 m alt., 2013, *G. Kantvilas* 362/13 (HO); Hanson Bay Track, c. 1 km S of Grassdale Homestead, 36°00'S 136°52'E, 5 m alt., 2015, *G. Kantvilas* 364/15 *& B. de Villiers* (AD, HO).

Carbonea latypizodes (Nyl.) Knoph & Rambold

Widespread and locally abundant on rocks in scrubby coastal vegetation and dry sclerophyll forest. Characterised by the grey, crustose thallus containing atranorin and 2'-*O*-methylperlatolic acid, and by the black apothecia with a blue-green epihymenium, yellow-brown hypothecium, *Lecanora*-type asci and simple, hyaline ascospores, 10–16 × 5–10 µm.

Northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2009, *G. Kantvilas* 362/09 (AD, HO); same locality, 2015, *G. Kantvilas* 478/15 (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 560/12, 756/12 *& B. de Villiers* (AD, HO); Western River Cove, summit of cliffs E of beach, 35°40'S 136°58'E, 50 m alt., 2015, *G. Kantvilas* 404/15 (AD, HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 533/15 (HO).

Carbonicola foveata (Timdal) Bendiksby & Timdal

On charred eucalypt wood in dry sclerophyll forest. This common, widespread and characteristically Australian crustose species was previously included in the genus *Hypocenomyce* (Bendiksby & Timdal 2013). **Fig. 30B.**

West Bay, 15 km SSW of Cape Borda, 35°53'S 136°33'E, 40 m alt., 1994, *H.T. Lumbsch* 10919, *A. Dickhäuser & H. Streimann* (CANB); Billygoat Falls, 35°42'S 136°55'E,

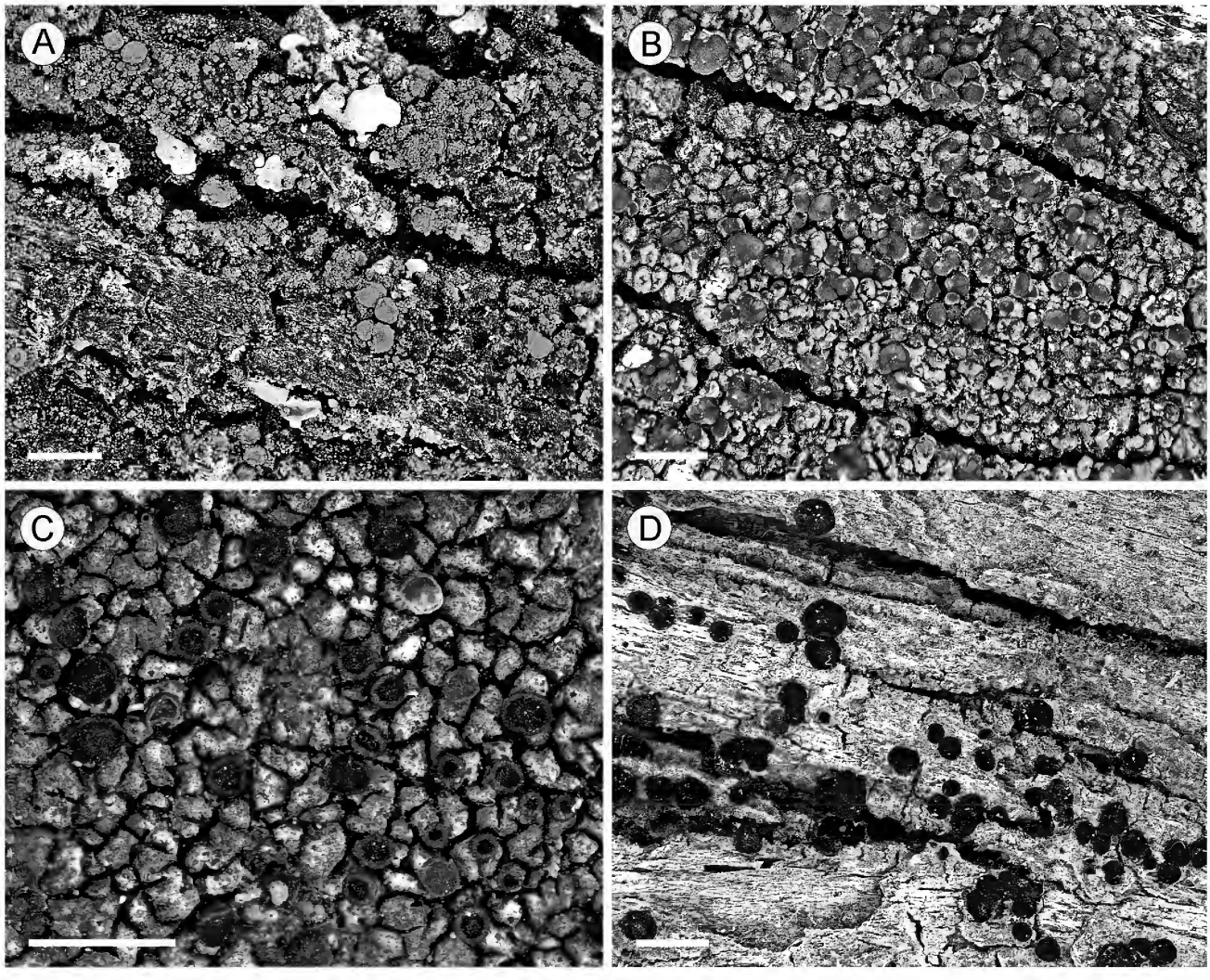

Fig. 30. A *Candelariella xanthostigmoides*. **B** *Carbonicola foveata*. **C** *Catillaria austrolittoralis*. **D** *Catinaria atropurpurea*. Scales = 1 mm. Photos: J. Jarman.

200 m alt., 2012, *G. Kantvilas* 582/12 *& B. de Villiers* (AD, HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 340/15 (HO).

[T]*Catillaria austrolittoralis* Kantvilas & van den Boom

Widespread and common on non-calcareous coastal rocks, forming dull olive-brown thalli in close association with orange *Caloplaca* species and the whitish *Tylothallia verrucosa*. Less commonly, it may also occur in more inland areas. The black, lecideine apothecia resemble those of an *Amandinea* or *Buellia*, but this species is easily distinguished by having *Catillaria*-type asci, dark brown-pigmented, capitate paraphyses, and hyaline, 1-septate ascospores. Whereas in Tasmania, this species contains either pannarin or argopsin, all Kangaroo Island specimens analysed contain only the former substance. This species also occurs in southern New South Wales, Victoria, the Bass Strait islands and Tasmania (Kantvilas & van den Boom 2013). **Fig. 30C.**

Point Ellen, 2 km S of Vivonne Bay, 36°00 137°11'E, 4 m alt., 1985, *J.A. Elix* 19595 *& L.H. Elix* (CANB); Stokes Bay, 35°37'S 137°12'E, 2 m alt., 1985, *J.A. Elix* 19661 *& L.H. Elix* (CANB); Hog Bay, 35°43'S 137°57'E, 2 m alt., 1985, *J.A. Elix* 19670 *& L.H. Elix* (CANB); Cape Willoughby, 35°50'S 138°08'E, 2008, *G. Kantvilas* 331/08 (HO); Antechamber Bay, 35°47'S 138°05'E, sea-level, 2008, *G. Kantvilas* 333/08 (HO); near King George Beach, 35°39'S 137°07'E, 2 m alt., 2011, *G. Kantvilas* 328/11 (AD, herb. v.d.Boom, HO); Ravine des Casoars, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 479/12 *& B. de Villiers* (herb. v.d.Boom, HO); Windmill Bay, 35°51'S 138°07'E, 1 m alt., 2012, *G. Kantvilas* 493/12 (HO); Stokes Bay, 35°37'S 137°13'E, 1 m alt., 2012, *G. Kantvilas* 514/12 *& B. de Villiers* (AD, BM, CANB, herb. v.d.Boom, HO, MSC, UPS) [type]; Penneshaw foreshore near Frenchmans Rock, 35°43'S 137°57'E, 2 m alt., 2013, *G. Kantvilas* 194/13 (AD, HO); Ironstone Hills, 35°44'S 137°57'E, 70 m alt., 2015, *G. Kantvilas* 374/15 (HO); Rocky River, c. 250 m from mouth, 35°58'S 136°39'E, 10 m alt., 2015, *G. Kantvilas* 514/15 *& B. de Villiers* (HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 535/15 (HO).

[a]*Catillaria nigroclavata* (Nyl.) Schuler

Occasional on twigs of *Melaleuca* in coastal heathland and on fibrous bark at the bases of eucalypts in mallee. This is the first Australian record of this widespread, chiefly Northern Hemisphere taxon. It is recognised by the crustose, immersed, ± inapparent thallus, the

tiny, black lecideine apothecia, 0.1–0.3 mm wide, the *Catillaria*-type asci, paraphyses with markedly capitate, brown apices, the pale brown hypothecium and 1-septate ascospores, 8–10 × 2.5–3 µm (see Fletcher & Coppins 2009a for further descriptive data).

Cape Borda, 35°45'S 136°35'E, 100 m alt., 1994, *H. Streimann* 54902 *p.p.* (AD, HO); Moffatt Road, 35°49'S 138°00'E, 70 m alt., 2011, *G. Kantvilas* 254/11 *& B. de Villiers* (HO).

[5]*Catinaria atropurpurea* (Schaer.) Vězda & Poelt

On bark and wood in dry sclerophyll forest and mallee. Characterised by the scurfy to minutely granular thallus, dark reddish brown to blackish, biatorine apothecia, 8-spored, *Catillaria*-type asci and thick-walled, hyaline, 1-septate ascospores, 10–15 × 5–7 µm, with a gelatinous halo. **Fig. 30D.**

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 781/12 (HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 313/15, 342/15 (HO).

Chrysothrix xanthina (Vain.) Kalb.

On the bark of larger, older trees in oldgrowth mallee and *Callitris*-dominated woodland. The sterile, powdery, bright yellow thallus of this species produces a diagnostic bright yellow acetone extract, which distinguishes it from other, potentially-confusing taxa.

The old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 352/13 *& B. de Villiers* (HO); Pelican Lagoon Conservation Park, along Mitchell Drive, 35°48'S 137°48'E, 10 m alt., 2015, *G. Kantvilas* 308/15 (AD, HO, NY).

Cladia aggregata (Sw.) Nyl.

Widespread on soil or at the bases of trees in heathland, mallee and dry sclerophyll forest. This is a very variable species, morphologically and chemically, with several of the variants recognised at specific rank (Kantvilas & Elix 1999). However, all specimens from Kangaroo Island are remarkably uniform and invariably contain barbatic acid, the most common chemosyndrome.

Recent research by Parnmen *et al.* (2013) has led to further subdivision of *Cladia aggregata*, essentially on the basis of DNA-sequence data. It also suggests that the name *C. aggregata* itself (based on a type from the West Indies) should not be applied in Australia. However, many aspects of this work are, in my opinion, inconclusive and poorly explained, and offer little or no correlation between molecular data, morphology and chemistry. Until some of these issues are resolved, I have elected to retain the concept of *C. aggregata* as applied by lichenologists in Australia over the past two decades (see Kantvilas & Elix 1999). **Fig. 31.**

Near Western Cove, 35°42'S 137°38'E, 1884, *J.G.O. Tepper* 1332 (AD); [Rocky River area], 1940, *J.B. Cleland s.n.* (AD); Rocky River, 1948, *J.B. Cleland s.n.* (AD); base of Mt Taylor, 1971, *G. Jackson* 761 (AD); Kingscote Council quarries, 35°39'S 137°38'E, 1971, *G. Jackson* 766 (AD); N of Mt Taylor, 1971, *G. Jackson* 805 (AD); Rocky River Koala Sanctuary, 1971, *R.D. Seppelt* 960 (HO); c. 4 km S of Emu Bay, 35°39'S 137°30'E, 1972, *R.D. Seppelt* 700 (HO); 10 km SSE of Western River, 35°46'S 137°01'E, 1972, *R.D. Seppelt* 792, 793 (AD); 11 km S of Western River, 1972, *R.D. Seppelt* 831 (HO); 6 km E of Cape Borda, 1972, *R.D. Seppelt* 867, 869 (HO); c. 10 km E of Cape Borda, 35°45'S 136°42'E, 1972, *R.D. Seppelt* 868 (AD, MEL); 30 km ESE of Cape Borda, 35°51'S 136°54'E, 1972, *R.D. Seppelt* 891 (AD); c. 1.5 km W of Kingscote Airport, 1972, *R.D. Seppelt* 2108 (MEL); c. 21 km SSW of American River, 35°53'S 137°36'E, 1972, *R.D. Seppelt* 2192 (HO); eastern end, 1974, *M. Allender s.n.* (MEL); Western River, 1974, *M. Allender s.n.* (MEL); between Cape Hart and Cape Willoughby, 35°52'S 138°05'E, 1982, *K. Stove* 1435 (AD); Parndana Conservation Park, 35°45'S 137°19'E, 1982, *K. Stove* 1560 (AD); W of Yacca Flat, 36°01'S 136°44'E, 1982, *K. Stove* 1586 (AD); clay pan, c. 4 km ESE of car park at West Bay, 35°54'S 136°35'E, 1982, *K. Stove* 1681 (AD); Ravine des Casoars, 35°48'S 136°37'E, 1982, *K. Stove* 1698 (AD); E side of Middle River, between dam and Strepera Waterfall, 35°43'S 137°06'E, 1982, *K. Stove* 1776 (AD); D'Estrees Bay, 35°56'S 137°37'E, 1984, *G. Jackson* 1529 (AD); Playford Hwy, 1 km W of Parndana, 35°47'S 137°15'E, 160 m alt., 1985, *J.A. Elix* 19665 *& L.H. Elix* (CANB); Scotts Cove Lookout, 35°46'S 136°37'E, 120 m alt., 1985, *J.A. Elix* 19713 *& L.H. Elix* (CANB); Ravine des Casoars, 35°48'S 136°37'E, 20 m alt., 1985, *J.A. Elix* 19728 *& L.H. Elix* (CANB); Harveys Return, 35°46'S 136°34'E, 60 m alt., 1985, *J.A. Elix* 19740 *& L.H. Elix* (CANB); 1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuehl s.n.* (MEL); along banks of Middle River, 35°44'S 137°04'E, 1989, *D.N. Kraehenbuehl* 5173, 5170 (AD); mouth of De Mole River, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55126 (CANB);

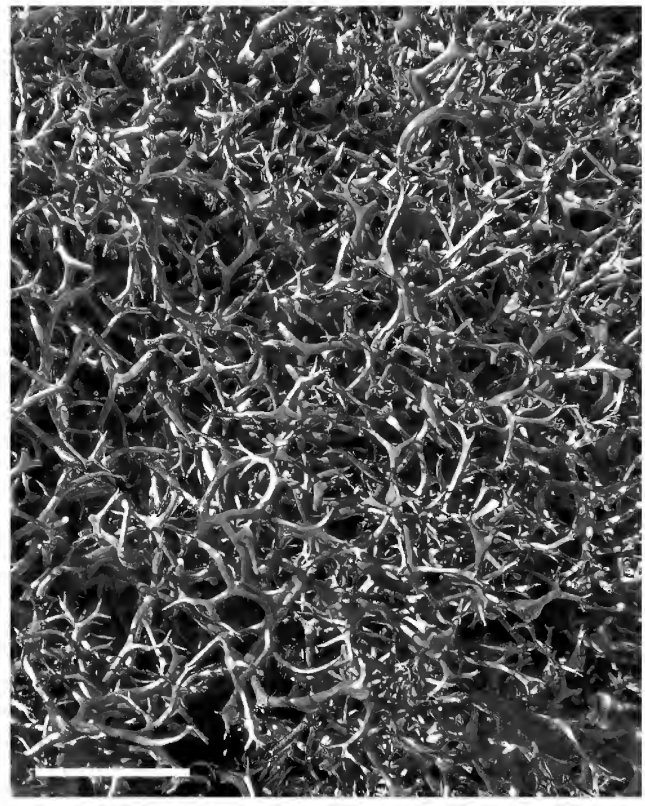

Fig. 31. *Cladia aggregata*. On Kangaroo Island, this usually variable, widespread species is remarkably uniform in its morphology and chemical composition. Scale = 10 mm.

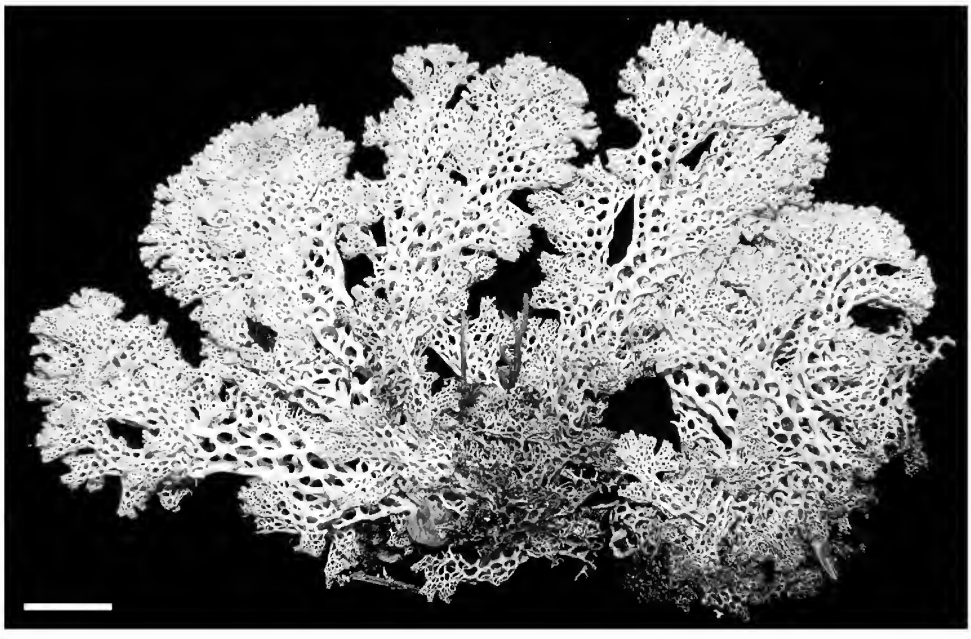

Fig. 32. *Cladia ferdinandii*, presumed extinct on the island. Scale = 10 mm. Photo: J. Jarman.

Ravine des Casoars, 35°48'S 136°37'E, 70 m alt., 1994, *H. Streimann* 54910 (CANB); about 2 km W of South West River, 35°59'S 136°50'E, 50 m alt., 2007, *R.W. Rogers* 11512 (BRI); Lesueur Conservation Park, c. 3.5 km SW of Cape Willoughby, 35°51'S 138°06'E, 10 m alt., 2009, *G. Kantvilas* 354/09, 355/09 (AD, HO); Lades Road, 35°52'S 137°30'E, 30 m alt., 2011, *G. Kantvilas* 322/11 (HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 567/12 & *B. de Villiers* (HO).

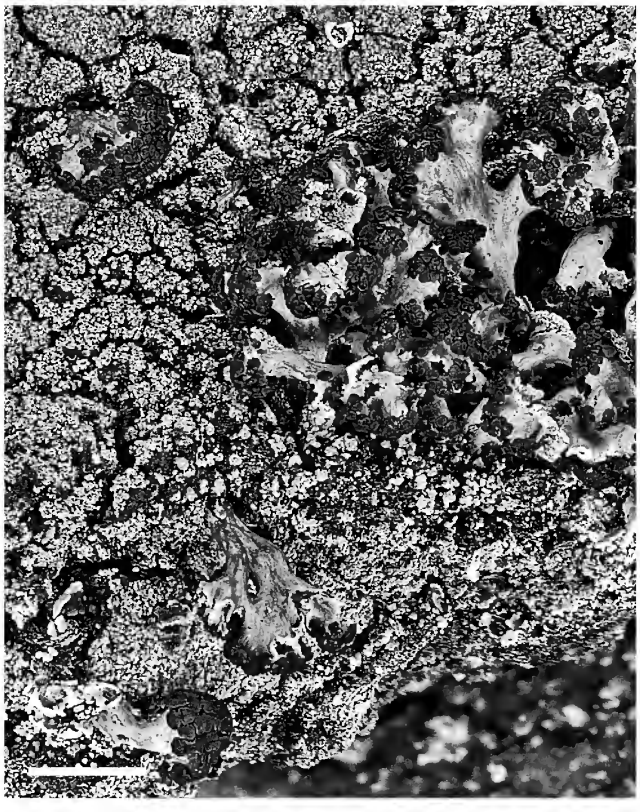

Fig. 33. *Cladia schizopora*, showing pseudopodetia topped wih blackberry-like clusters of apothecia, arising from a sorediate, basal thallus. Scale = 2 mm. Photo: J. Jarman.

Cladia ferdinandii (Müll.Arg.) Filson

This striking species of 'coral lichen' was searched for extensively without success and is presumed to be now extinct on the island. Although its known locations are rather vague, the general areas they represent have been severely modified or degraded. It could be expected to have occurred near the coast on sandy open ground in heathland or beneath sparse *Melaleuca*. **Fig. 32.**

[without date or location], *Tate s.n.* (MEL); Muston Gypsum Mine, 35°49'S 137°44'E, 1976, *G. Jackson* 1071 (AD, MEL); c. 5 km ESE of Kingscote Aerodrome, adjacent to Western Cove, 35°43'S 137°34'E, 1995, *L. Zinnack s.n.* (AD).

Cladia schizopora (Nyl.) Nyl.

On burnt or rotting wood in dry sclerophyll forest and mallee. **Fig. 33.**

Parndana Conservation Park, 35°45'S 137°19'E, 1982, *K. Stove* 1558 (AD); Ravine des Casoars, 35°48'S 136°37'E, 20 m alt., 1985, *J.A. Elix* 19726, 19727 *& L.H. Elix* (CANB); same locality, 70 m alt., 1994, *H.T. Lumbsch* 10907, *A. Dickhäuser & H. Streimann* (CANB); mouth of De Mole River, 35°43'S 136°47'E, 20 m alt., 1994, *H.T. Lumbsch* 10923, *A. Dickhäuser & H. Streimann* (CANB); same locality, 1994, *H. Streimann* 55115, 55123 (CANB); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 332/15 *& B. de Villiers* (HO).

Cladonia capitellata var. *squamatica* A.W.Archer

On soil. This yellow, clump-forming lichen tends to be common and widespread in southern Australia, yet the single Kangaroo Island specimen dates from the 19th century. **Fig. 34.**

Near Western Cove, 1884, *J.G.O. Tepper* 1331 (AD).

Cladonia enantia Nyl. var. *enantia*

Occasional on soil and burnt wood in mallee woodland and coastal heathland. Characterised by esorediate, corticate podetia that are frequently vertically fissured, capped with brown apothecia or clusters of apothecia,

Fig. 34. *Cladonia capitellata* var. *squamatica*, a widespread southern Australian lichen presumed extinct on Kangaroo Island. Scale = 10 mm.

and contain fumarprotocetraric acid as the sole dominant compound (cortex P+ red). It frequently occurs as mats of sterile squamules only. **Fig. 35A.**

N of Murray Lagoon, 35°55'S 137°25'E, 1972, *R.D. Seppelt* 2074 (MEL); Vivonne Bay, 1972, *R.D. Seppelt* 2122 (HO); [no specific locality], 1978, *E.M. Martin* 1.2 (AD); corner of Playford Hwy, Birchmore Hwy and road to Kingscote aerodrome, 35°42'S 137°31'E, 1982, *K. Stove* 1795 (AD); Point Ellen, 36°00'S 137°11'E, 3 m alt., 2013, *G. Kantvilas* 217/13 (AD, HO); near Kingscote Airport along Aranmore Road, 35°42'S 137°32'E, 5 m alt., 2015, *G. Kantvilas* 500/15 *& B. de Villiers* (HO).

Cladonia humilis (With.) J.R.Laundon

On soil in dry sclerophyll forest. Characterised by the neatly cup-shaped podetia containing atranorin and fumarprotocetraric acid. **Fig. 35B.**

Mouth of De Mole River, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55111 (AD, CANB); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 568/12, 569/12 *& B. de Villiers* (AD, HO).

[5]*Cladonia macilenta* Hoffm.

Recorded from a rotting *Melaleuca* trunk in swampy woodland. This is one of relatively few red-fruited species of *Cladonia*, further characterised by short (mostly to 2 mm) podetia that are sorediate in the upper part, and by a distinctive chemistry comprising thamnolic, barbatic and didymic acids. The Kangaroo Island specimen is poorly developed and was identified chiefly by its chemical composition. **Illustration:** Stenroos *et al.* (2016: 187).

Lashmar Lagoon, 35°48'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 255/11 (HO).

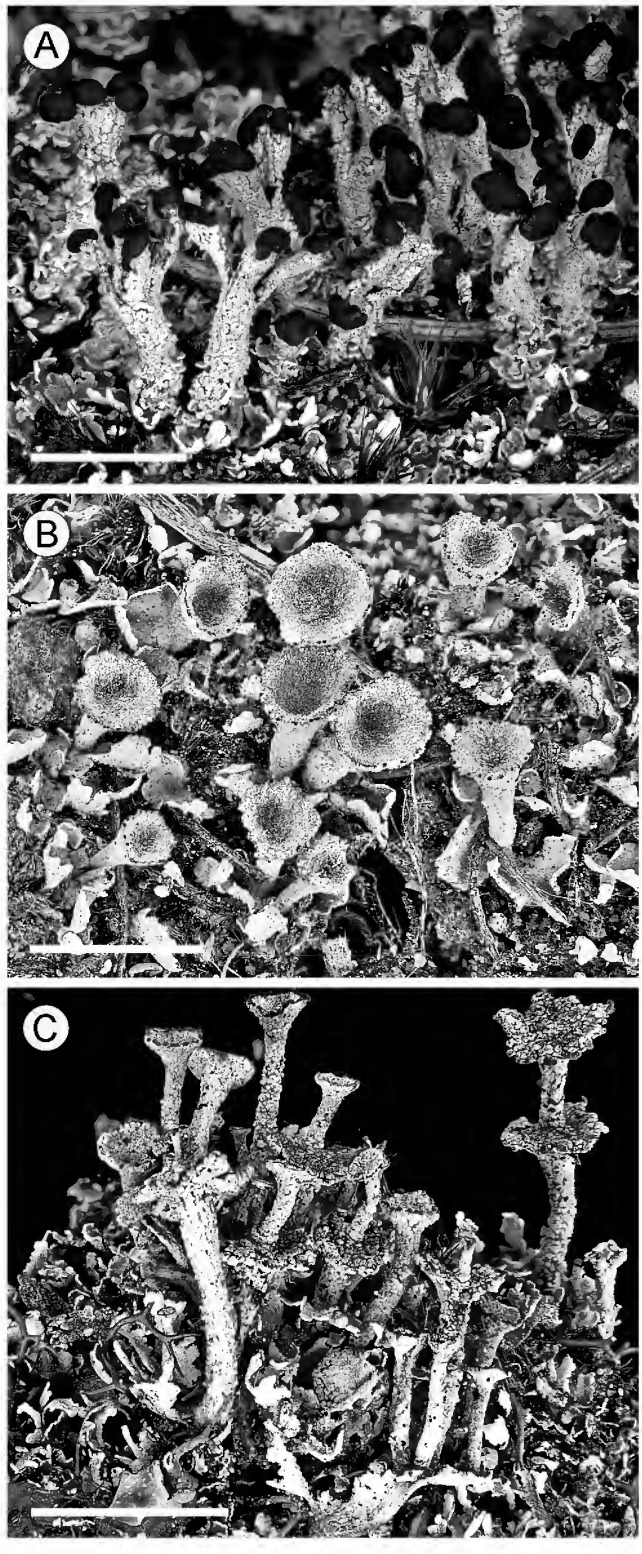

Fig. 35. A *Cladonia enantia* var. *enantia*. **B** *Cladonia humilis*. **C** *Cladonia verticillata*. Scales = 5 mm. Photos: J. Jarman.

Cladonia neozelandica var. *striata* (A.W.Archer) Kantvilas

On sandy soil in heathland and woodland. This lichen commonly occurs as a mat of basal squamules only and is recognised by its characteristic chemistry of atranorin and bourgeanic acid, together with norstictic and connorstictic acids (squamules K+ yellow→red).

Willson River Road, c. 1 km SE from Pigs Head Corner, 35°47'S 137°58'E, 1982, *K. Stove* 1470 (AD); Cape Gantheaume Conservation Park, c. 2 km from entrance, 36°00'S 137°36'30"E, 1982, *K. Stove* 1512 (AD); 3 km E of Seal Bay, 36°00'S 137°21'E, 30 m alt., 1985, *J.A. Elix* 19590 *& L.H. Elix* (CANB); Rocky River, 35°58'S 136°39'E, 40 m alt., 1994, *H. Streimann* 55055A (CANB); North Cape Road, 35°36'S 137°35'E, 5 m alt., 2013, *G. Kantvilas* 253/13 *& B. de Villiers* (AD, HO); c. 1.5 km SW of Point Ellen, 36°00'S 137°11'E, 10 m alt., 2015, *G. Kantvilas* 439/15 (AD, HO).

Cladonia neozelandica var. *sulcata* (A.W.Archer) Kantvilas

On sandy soil in heathland and woodland. Like other varieties of this species, this lichen commonly occurs as a mat of basal squamules only and is recognised by its characteristic chemistry of atranorin and bourgeanic acid, together with psoromic acid (squamules P+ yellow) (Kantvilas 2013).

Harveys Return, 35°46'S 136°34'E, 50 m alt., 1985, *J.A. Elix* 19736 *& L.H. Elix* (CANB); Cape Borda, 35°45'S 136°36'E, 120 m alt., 2010, *G. Kantvilas* 188/10 (AD, HO); North Cape Road, 35°36'S 137°35'E, 5 m alt., 2013, *G. Kantvilas* 259/13 *& B. de Villiers* (HO).

[5]*Cladonia ochrochlora* Flörke

On wood and soil, sometimes over rock outcrops, in dry sclerophyll forest. This variable species is recognised by the discrete patches of farinose soredia that occur in the upper part of the simple to sparingly branched podetia and at the margin of its narrow, abruptly flaring terminal cups; it contains fumarprotocetraric acid together with traces of quaesitic acid.

Mouth of De Mole River, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55095, 55107, 55124 (AD, CANB).

Cladonia praetermissa A.W.Archer var. *praetermissa*

On soil in gaps in mallee woodland. Recognised by the prominent basal squamules with rather club-shaped podetia that have coarsely sorediate apices; it contains atranorin and fumarprotocetraric acid.

Vivonne Bay, 1972, *R.D. Seppelt* 2127 (HO); Hog Bay Road, 35°46'S 137°37'E, 20 m alt., 2013, *G. Kantvilas* 210/13 (HO); Hanson Bay Track, c. 1 km S of Grassdale Homestead, 36°00'S 136°52'E, 5 m alt., 2015, *G. Kantvilas* 370/15 *& B. de Villiers* (HO).

Cladonia rigida var. *acuta* (Taylor) A.W.Archer

On charred or rotting wood in eucalypt woodland. This species is recognised by its acute, ecorticate, squamulose to coarsely granular podetia that contain thamnolic and homosekikaic acids, with additional barbatic acid found only in the apothecia.

Flinders Chase, [Rocky River] Koala Sanctuary, 1971, *G. Jackson* 823 (AD); same locality, 1972, *R.D. Seppelt* 972 (HO); 4 km W of Rocky River Homestead, 35°57'S 136°42'E, 50 m alt., 1985, *J.A. Elix* 19623 *& L.H. Elix* (CANB).

[5]*Cladonia subradiata* (Vainio) Sanstede

On rotting wood, mostly in moister sites in old woodlands such as those dominated by *Callitris*. This is a complex and, in many respects, poorly understood taxon (e.g. see Ahti 2000). Specimens from Kangaroo Island contain fumarprotocetraric acid (P+ red) and have greyish green, erect, mostly simple podetia to

Fig. 36. *Cladonia subradiata*. Scale = 10 mm. Photo: J. Jarman.

c. 15 mm tall, that are corticate at the very base, have a few squamules and are densely farinose sorediate in the upper part, typically terminating with acute or minutely cup-shaped apices. However, occasionally, well-developed cups to c. 3 mm wide may also be present, rarely also with marginal proliferations. **Fig. 36.**

Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 441/12 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 357/13 *& B. de Villiers* (AD, HO); Pelican Lagoon Conservation Park, along Mitchell Drive, 35°48'S 137°48'E, 10 m alt., 2015, *G. Kantvilas* 305/15 (AD, HO).

Cladonia verticillata (Hoffm.) Schaer.

Widely scattered on soil, especially in mallee woodland and dry sclerophyll forest. This is the most common species of *Cladonia* on the island, characterised by rather slender, cup-shaped, centrally-proliferating podetia with a continuous to areolate cortex throughout, brown apothecia, and containing fumarprotocetraric acid as the sole dominant compound. In Australasian literature (e.g. McCarthy 2018), this taxon is often referred to as *C. cervicornis* subsp. *verticillata* (Hoffm.) Ahti. **Fig. 35C.**

Rocky River, 1948, *J.B. Cleland s.n.* (AD); 4 km S of Emu Bay, 35°39'S 137°30'E, 1972, *R.D. Seppelt* 703 (HO); N of Murray Lagoon, 35°55'S 137°25'E, 1972, *R.D. Seppelt* 2073 (MEL); 1.5 km W of Kingscote Airport, 35°43'S 137°30'E, 1972, *R.D. Seppelt* 2106 (MEL), 2107 (AD); Vivonne Bay, 1972, *R.D. Seppelt* 2123 (HO); clay pan c. 4 km ESE from West Bay car park, 35°54'S 136°35'E, 1982, *K. Stove* 1682 (AD); 1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuehl s.n.* (MEL); mouth of De Mole River, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55098 (AD, CANB); c. 2.5 km SW of Cape St Albans 35°49'S 138°07'E, 100 m alt., 2010, *G. Kantvilas* 198/10 (AD, HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 440/12 *& B. de Villiers* (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 566/12 *& B. de Villiers* (AD, HO); Pelican Lagoon Conservation Park, along Mitchell Drive, 35°48'S 137°48'E, 10 m alt., 2015, *G. Kantvilas* 304/15 (AD, HO).

[a]*Clauzadea metzleri* Clauzade & Cl.Roux ex D.Hawksw.

On limestone. Recognised by the superficial to only slightly immersed, black-brown apothecia <0.4 mm wide, the *Porpidia*-type asci and simple ascospores, 18–32 × 8–14 µm (see Meyer 2002 for further descriptive data).

Approx. 3.5 km NE of Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 530/12 (HO).

[s]*Cliostomum griffithii* (Sm.) Coppins

On bark in a remnant *Callitris* stand and in old mallee woodland. This tiny crustose species is characterised by its biatorine, pink, pale grey or blackish apothecia, *Biatora*-type asci and mostly 1-septate, hyaline ascospores, 8–16 × 2.5–5 µm (Kantvilas & Elix 1995).

Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 425/12 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 349/13 *& B. de Villiers* (AD, HO).

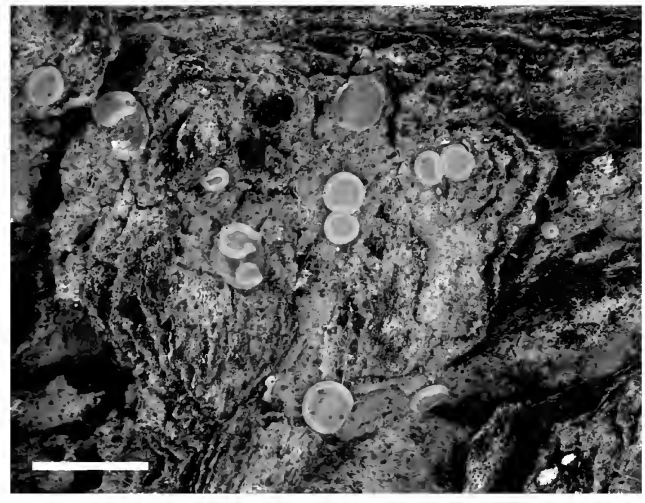

Fig. 37. *Coenogonium australiense*. Scale = 2 mm. Photo: J. Jarman.

Coenogonium australiense Kantvilas & Lücking

On the bark of old, fissured *Callitris* trunks in remnant stands of coniferous woodland. This is a remarkable record for the island of a genus which is generally found in wet forests worldwide. It is characterised by a thin thallus with a *Trentepohlia* photobiont, biatorine, orange apothecia to 2.5 mm wide, and hyaline, 1-septate ascospores, 10–14 × 3–4 (–4.5) µm, and has also been recorded from Tasmania and New South Wales (Kantvilas *et al.* 2018). **Fig. 37.**

Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 439/12 *& B. de Villiers* (HO); Pelican Lagoon Conservation Park, along Mitchell Drive, 35°48'S 137°48'E, 10 m alt., 2015, *G. Kantvilas* 316/15 *& B. de Villiers* (AD, HO).

Collema coccophorum Tuck.

On consolidated soil and limestone. Otálora *et al.* (2014) reinstated the genus *Enchylium* for this taxon, but I have elected to retain the more conservative taxonomy at this stage.

4 km S of Emu Bay, 1972, *R.D. Seppelt* 698A (HO); Stokes Bay, 35°34'S 137°13'E, 1972, *R.D. Seppelt* 751A (HO); Flinders Chase National Park, car park on Rocky River, 35°57'S 136°42'E, 1982, *K. Stove* 1635 (AD); Ravine des Casoars, 35°48'S 136°35'E, 10 m alt., 2012, *G. Kantvilas* 455/12 (AD, HO).

Collema glaucophthalmum Nyl. var. *glaucophthalmum*

Common on bark in coastal scrub, especially on shrubs with fibrous bark such as *Leucopogon* and *Melaleuca*. It is typically intermixed with variety *implicatum*, with which it shares an identical black, puckered and blistered, foliose thallus, but from which it differs by having grey pruinose apothecia. **Fig. 38.**

3 km E of Seal Bay, 35°59'S 137°21'E, 30 m alt., 1985, *J.A. Elix* 19585 *& L.H. Elix* (CANB); D'Estrees Bay, 35°56'S 137°36'E, 2 m alt., 1985, *J.A. Elix* 19707 *& L.H. Elix*

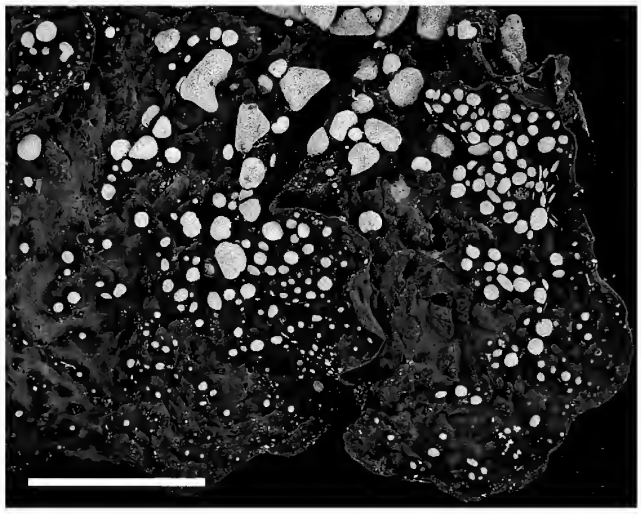

Fig. 38. *Collema glaucophthalmum* var. *glaucophthalmum*. Scale = 5 mm. Photo: J. Jarman.

(CANB); West Bay, 15 km SSW of Cape Borda, 35°53'S 136°33'E, 40 m alt., 1994, *H. Streimann* 55023 *p.p.* (CANB); Cape du Couedic Road, 35°56'S 136°45'E, 100 m alt., 2007, *R.W. Rogers* 11510A (BRI).

Collema glaucophthalmum var. *implicatum* (Nyl.) Degel.

Rather common and widespread on bark, mostly in coastal scrub, but also occasional in damper places in mallee woodland where it may grow on the bases of eucalypts.

Bunker Hill, c. 7 km S of Rocky River Homestead, 36°01'S 136°44'E, 1982, *K. Stove* 1606 (AD); 3 km E of Seal Bay, 35°29'S 137°21'E, 30 m alt., 1985, *J.A. Elix* 19586 *& L.H. Elix* (CANB); D'Estrees Bay, 35°56'S 137°36'E, 2 m alt., 1985, *J.A. Elix* 19706 *& L.H. Elix* (CANB); West Bay, 15 km SSW of Cape Borda, 35°53'S 136°33'E, 40 m alt., 1994, *H. Streimann* 55023 *p.p.* (CANB); same locality, 1994, *H.T. Lumbsch* 10920b, *A. Dickhäuser & H. Streimann* (CANB); Cape du Couedic Road, 35°56'S 136°45'E, 100 m alt., 2007, *R.W. Rogers* 11510B (BRI); Moffatt Road, 35°49'S 138°00'E, 70 m alt., 2011, *G. Kantvilas* 250/11 *& B. de Villiers* (HO); West Bay, 35°53'S 136°33'E, 10 m alt., 2011, *G. Kantvilas* 295/11 (HO).

Collema subflaccidum Degel.

On the bark of *Melaleuca* at the coast. Recognised by the rounded, olive-black lobes densely covered with granular isidia. **Illustration:** Brodo *et al.* (2001: Fig. 200).

D'Estrees Bay, 35°56'S 137°36'E, 2 m alt., 1985, *J.A. Elix* 19708 *& L.H. Elix* (CANB).

Collemopsidium sp.

On rocks in dry sclerophyll forest, growing amongst thalli of *Byssoloma subdiscordans*. Characterised by the cyanobacterial photobiont, the tiny, black perithecia and 1-septate, fusiform ascospores, 20–26 × 5–8 µm.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 563/12A (HO).

[s]*Cyphelium trachylioides* (Nyl.) Erichsen ex Keissl.

On bleached eucalypt wood such as old fence posts. Recognised by the crustose or inapparent thallus with black sessile, powdery mazaedia to c. 0.5 mm wide, with brown, broadly ellipsoid, 1-septate, smooth-walled ascospores, 18–24 × 10–14 µm (Tibell 1987).

E of Wisanger Park Homestead, 35°37'S 137°28'E, 80 m alt., 1985, *J.A. Elix* 19630 & *L.H. Elix* (CANB).

Diploicia canescens (Dicks.) A.Massal.

Locally common on rocks, bark and wood, especially near the coast. Fertile material is relatively uncommon although apothecia occur on some corticolous specimens. I have not attempted to apply the chemically-defined subspecific ranks (Elix *et al.* 1988) to the collections, although both subspecies *canescens* and subspecies *australasica* Elix & Lumbsch (as determined by J. Elix, pers. comm.) occur on the island. **Fig. 39A.**

Hog Bay, Penneshaw, 35°43'S 137°56'E, 2 m alt., 1985, *J.A. Elix* 19678 *& L.H. Elix* (CANB); northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2009, *G. Kantvilas* 363/09 (AD, HO); Antechamber Bay near The Kona, 35°49'S 138°06'E, 10 m alt., 2010, *G. Kantvilas* 208/10 (AD, HO); Pelican Lagoon, 35°49'S 137°48'E, 10 m alt., 2012, *G. Kantvilas* 407/12 *& B. de Villiers* (AD, HO); Point Ellen, 36°00'S 137°11'E, 2 m alt., 2012, *G. Kantvilas* 460/12 *& B. de Villiers* (AD, HO); Strawbridge Point, 35°47'S 137°47'E, 5 m alt., 2012, *G. Kantvilas* 540/12 *& B. de Villiers* (HO); southern end of Antechamber Bay, 35°48'S 138°06'E, 10 m alt., 2013, *G. Kantvilas* 203/13 (HO); Red House Bay, 35°49'S 138°06'E, 15 m alt., 2013, *G. Kantvilas* 315/13, 316/13 (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 5 m alt., 2013, *G. Kantvilas* 353/13 *& B. de Villiers* (AD, HO); Eastern Cove, c. 2.5 km NE of American River, 35°46'S 137°47'E, 5 m alt., 2015, *G. Kantvilas* 493/15 (AD, HO).

[s]*Diploschistes gyrophoricus* Lumbsch & Elix

On non-calcareous rocks in mallee woodland and dry sclerophyll forest. Characterised by the immersed, perithecioid ascomata and the presence of gyrophoric acid (see Mangold *et al.* 2009). **Fig. 39B.**

Cape Willoughby Road, 35°50'S 138°06'E, 110 m alt., 2011, *G. Kantvilas* 326/11 (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 556/12 *& B. de Villiers* (AD, HO); Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 374/13 (AD, HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2015, *G. Kantvilas* 481/15 (HO).

Diploschistes muscorum (Scop.) R.Sant. subsp. *bartletti* Lumbsch

On consolidated soil in mallee woodland. Characterised by the urceolate apothecia and the presence of lecanoric and diploschistesic acids (appearing as a pair of yellowish spots on developed t.l.c. plates). This species is very similar to *D. thunbergianus* (see below) from which it differs chiefly by being associated with the basal squamules of *Cladonia* (at least when juvenile) and by having invariably 8-spored (rather than 4- or 8-spored) asci. **Fig. 39C.**

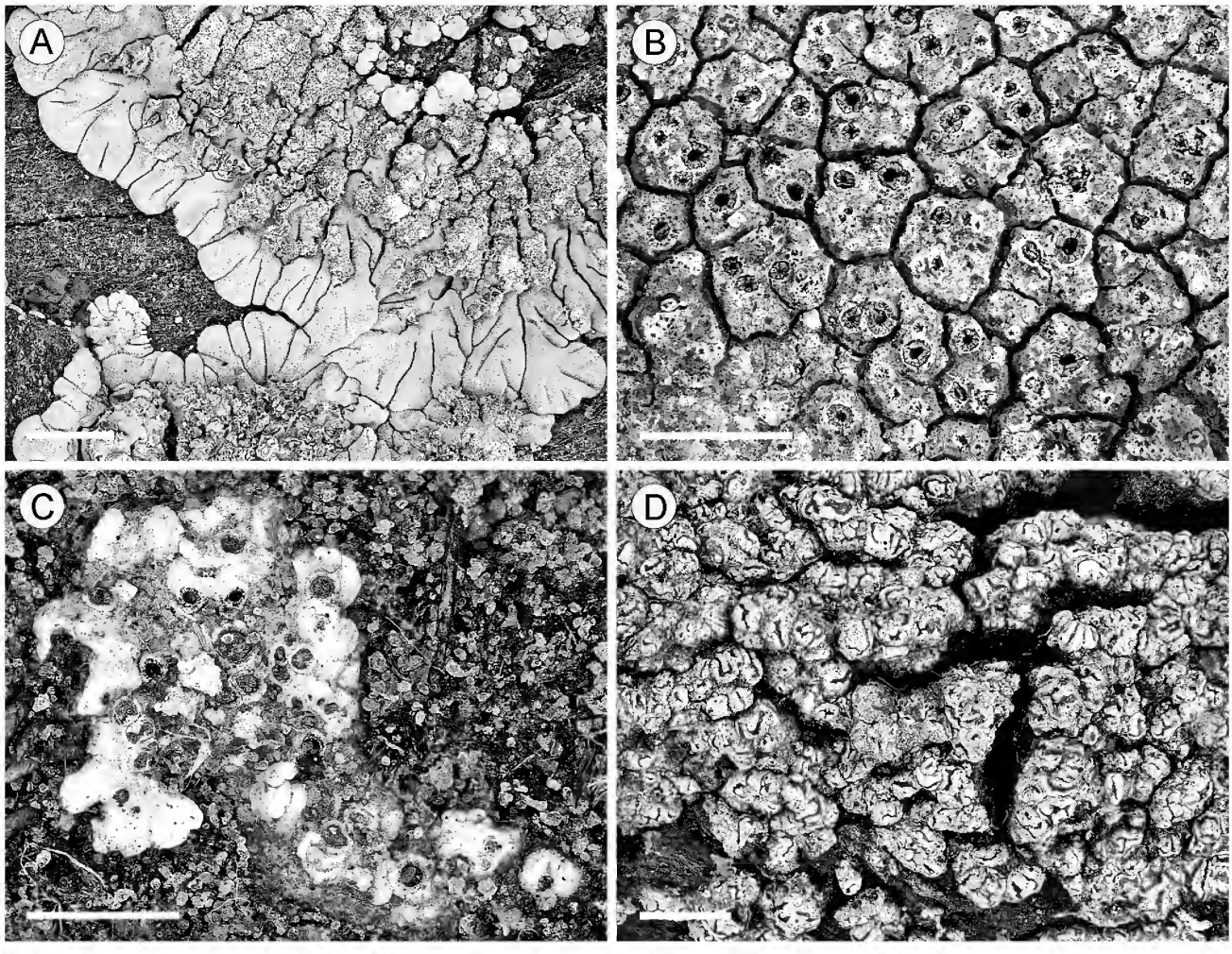

Fig. 39. A *Diploicia canescens*. **B** *Diploschistes gyrophoricus*. **C** *Diploschistes muscorum* subsp. *bartlettii*, with urceolate apothecia immersed in the grey squamules of a species of *Cladonia*. **D** *Enterographa divergens*, with slit-like apothecia within thalline warts. Scales = 2 mm. Photos: J. Jarman.

North Cape Road, 35°36'S 137°35'E, 5 m alt., 2013, *G. Kantvilas* 258/13 *& B. de Villiers* (HO); Hanson Bay Track, c. 1 km S of Grassdale Homestead, 36°00'S 136°52'E, 5 m alt., 2015, *G. Kantvilas* 371/15 *& B. de Villiers* (HO); near Kingscote Airport, Aranmore Road, 35°42'S 137°32'E, 5 m alt., 2015, *G. Kantvilas* 502/15 *& B. de Villiers* (AD, HO).

Diploschistes thunbergianus Lumbsch & Vězda

On consolidated soil in open areas such as rough pasture and gaps in woodland; uncommon and highly localised. Very similiar to the preceding species, although when both are present, they can usually be distinguished *in situ* by being somewhat different shades of grey.

4 km S of Emu Bay, 35°39'S 137°30'E, 1972, *R.D. Seppelt* 701 (HO); 1.6 km from Seal Bay, 1972, *R.D. Seppelt* 2025 (HO); Willson River Road, 35°50'S 138°01'E, 30 m alt., 2011, *G. Kantvilas* 249/11 (AD, HO); near King George Beach, 35°39'S 137°07'E, 10 m alt., 2011, *G. Kantvilas* 334/11 *& B. de Villiers* (AD, HO); Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 526/12 *& B. de Villiers* (AD, HO); near Kingscote Airport, Aranmore Road, 35°42'S 137°32'E, 5 m alt., 2015, *G. Kantvilas* 503/15 *& B. de Villiers* (AD, HO).

Diplotomma alboatrum (Hoffm.) Flot.

On coastal limestone; more rarely on bark in rather nutrient-enriched situations. With its thick, chalky white thallus, this species resembles the common *Buellia albula*, but can be easily distinguished by the lack of lichen substances and by its brown, muriform ascospores.

Ravine des Casoars, 35°48'S 136°35'E, 2 m alt., 2012, *G. Kantvilas* 450/12 (AD, HO); W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 496/12 (AD, HO); Point Ellen, 36°00'S 137°11'E, 3 m alt., 2013, *G. Kantvilas* 221/13A (HO); near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 275/13 (AD, HO).

Endocarpon simplicatum (Nyl.) Nyl. var. *simplicatum*

On consolidated soil in grassy woodland and rough pasture. This is one of several brownish, squamulose members of the Verrucariaceae, distinguished in the Kangaroo Island flora by its muriform ascospores that occur singly in the ascus (McCarthy 2001).

Kingscote, slopes of old quarry, 1972, *R.D. Seppelt* 659 (HO); 4 km S of Emu Bay, 1972, *R.D. Seppelt* 698 (HO); Hog Bay, 3 km E of Penneshaw, 35°43'S 137°56'E, 15 m alt.,

1994, *H. Streimann* 54862 (AD, CANB); track to Ironstone Hills, 35°43'S 137°57'E, 20 m, 2011, *G. Kantvilas* 310/11 (AD, HO); Lashmar Conservation Park, c. 2 km S of Cape Coutts, 35°47'S 138°04'E, 50 m alt., 2015, *G. Kantvilas* 430/15 *& B. de Villiers* (HO).

Endocarpon simplicatum var. *bisporum* P.M.McCarthy

On consolidated soil amongst limestone outcrops in coastal heathland. Distinguished from the preceding taxon by having 2-spored asci. **Illustration:** Eldridge & Tozer (1997: Fig. 4.5).

Rocky River Track, c. 1 km S of Snake Lagoon, 35°58'S 136°39'E, 50 m alt., 2015, *G. Kantvilas* 509/15 *& B. de Villiers* (HO).

[s]*Enterographa divergens* (Müll.Arg.) Redinger

Widespread but inconspicuous on twigs, usually on seashore trees and shrubs. This species is recognised by the pale grey to pinkish brown crustose thallus, elongate apothecia occurring in thalline warts, and 5–7-septate, fusiform ascospores, 26–34 × 4–5 µm. The ascospores are somewhat larger than cited by Sparrius (2004) but correspond with those observed in the type specimen from Victoria. **Fig. 39D.**

The Red Banks, 35°45'S 137°43'E, 2008, *G. Kantvilas* 328/08 (HO); c. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 120 m alt., 2011, *G. Kantvilas* 283/11 *& B. de Villiers* (HO); North Cape area, 3 km N of Cape Rouge, 35°35'S 137°38'E, 10 m alt., 2013, *G. Kantvilas* 249/13 (HO).

[a]*Ephebe ocellata* Henssen

An aquatic, cyanophilic species that forms tufts of black or olive-black, entangled filaments to c. 0.12 mm wide on rocks submerged in flowing fresh water. The fungal hyphae in this species form a network over the filaments of the *Stigonema* photobiont (Henssen 1963). **Fig. 40.**

Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 542/15 (AD, HO).

Fellhanera sp.

On sandstone outcrops in dry sclerophyll forest, growing together with *Byssoloma subdiscordans*. This collection almost certainly represents an undescribed species (P.M. McCarthy, pers. comm.), although the material is too scant for a formal description. It has an indistinct thallus with a trebouxioid photobiont, asci of the Pilocarpaceae-type, a purple, K+ greenish epihymenium, a coherent hymenium, ellipsoid, 1–3-septate ascospores, 9–12 × 4–5 µm, and bacilliform conidia, 8 × 0.5 µm. No species of the genus has hitherto been recorded for South Australia.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 562/12 *& B. de Villiers* (HO).

Flavoparmelia haysomii (C.W.Dodge) Hale

Widespread on rocks, especially near the coast, where it is associated with species of *Xanthoparmelia*. This large, lemon-yellow, foliose lichen with a black lower surface is readily recognised by having dactyls that become erumpent, abraded and sorediate.

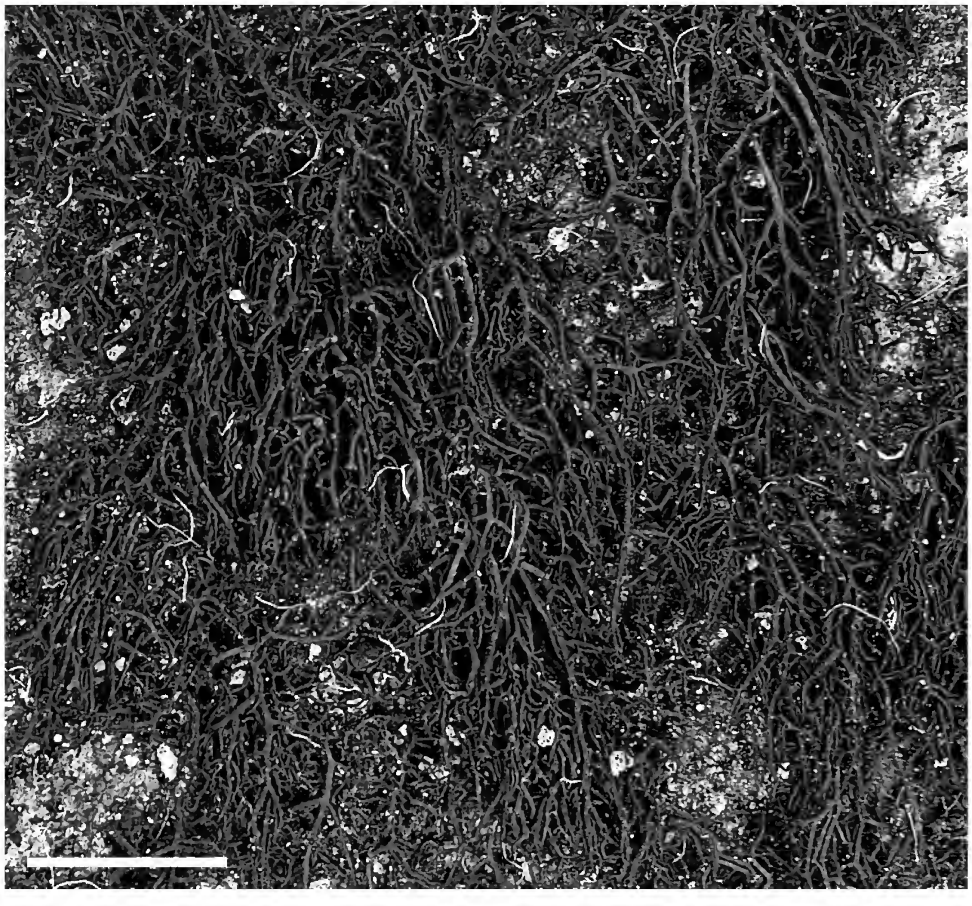

Fig. 40. *Ephebe ocellata*. Scale = 2 mm. Photo: J. Jarman.

Fig. 41. *Flavoparmelia rutidota*, one of the most common epiphytic macrolichens on the island. Scale = 10 mm.

Near American River, 1962, *M. McKay s.n.* (AD); W end of Antechamber Bay, 35°48'S 138°05'E, 2 m alt., 1985, *J.A. Elix* 19686 *& L.H. Elix* (CANB); Chapman River Estuary, 35°50'S 138°05'E, 3 m alt., 1985, *J.A. Elix* 19694 *& L.H. Elix* (CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55062, 55125 (CANB); Windmill Bay, 35°51'S 138°07'E, 2 m alt., 2011, *G. Kantvilas* 405/11 (HO).

Flavoparmelia rutidota (Hook.f. & Taylor) Hale

A very common and widespread, epiphytic, yellow-green, foliose lichen, typically colonising trees such as *Callitris*, *Exocarpos*, *Melaleuca* and *Allocasuarina* in dry sclerophyll forest, mallee, *Melaleuca* woodland and at the margins of paddocks. **Fig. 41.**

[Rocky River area], 1940, *J.B. Cleland s.n.* (AD); banks of Cygnet River near Lockwood Corner, 35°39'S 137°38'E, 1967, *G. Jackson* 526 (AD); 13 km E of Vivonne Bay, 35°55'S 137°16'E, 30 m alt., 1985, *J.A. Elix* 19579 *& L.H. Elix* (CANB); E of Wisanger Park Homestead, 35°37'S 137°28'E, 80 m alt., 1985, *J.A. Elix* 19633 *& L.H. Elix* (CANB); Harveys Return, 35°45'S 136°37'E, 1985, *J.H. Willis s.n.* (MEL); adjacent to Eleanor River, 3 km E of Little Sahara dunes, 35°57'S 137°17'E, 1989, *D.N. Kraehenbuehl* 5180 (AD); about 2 km W of South West River, 35°59'S 136°50'E, 2007, *R.W. Rogers* 11498 *p.p.* (BRI); The Kona, Antechamber Bay, 35°49'S 138°05'E, 50 m alt., 2010, *G. Kantvilas* 195/10 (AD, HO); Lashmar Lagoon, 35°49'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 273/11 *& B. de Villiers* (AD, HO); Pelican Lagoon, 35°49'S 137°48'E, 10 m alt., 2012, *G. Kantvilas* 404/12 *& B. de Villiers* (AD, HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 416/12 *& B. de Villiers* (AD, HO).

Flavoparmelia soredians (Nyl.) Hale

Recorded from a solitary *Allocasuarina* tree at the edge of a paddock. Distinguished from the common *F. rutidota* by the sorediate thallus where the medulla reacts K+ yellow→red, P+ orange (salazinic acid). **Fig. 42.**

Off Cape Willoughby Road at the Dudley Cellar Door, 35°45'S 138°02'E, 140 m alt., 2012, *G. Kantvilas* 403/12 *& B. de Villiers* (AD, HO).

Flavoparmelia springtonensis (Elix) Hale

Seemingly uncommon and collected from wood and bark at the margins of mallee woodland. This sorediate, yellow, foliose lichen is very similar to *F. soredians*, but is distinguished by the presence of physodalic acid (K± yellow-brown, P+ red).

Hanson Bay Track, c. 1 km S of Grassdale Homestead, 36°00'S 136°52'E, 5 m alt., 2015, *G. Kantvilas* 366/15 *& B. de Villiers* (AD, HO); near Kingscote Airport, 35°43'S 137°32'E, 5 m alt., 2015, *G. Kantvilas* 496/15 *& B. de Villiers* (AD, HO).

Fuscopannaria decipiens (P.M.Jørg. & D.J.Galloway) P.M.Jørg.

In moister microhabitats, on the bases of mature *Melaleuca* in mallee woodland; more rarely overgrowing bryophytes on rocks. The genus *Fuscopannaria* is distinguished from superficially similar genera of the family Pannariaceae by having asci with an amyloid ring structure. Published accounts of the genus (Jørgensen & Galloway 1992; Jørgensen 1999, 2001) cite, *inter alia*, ascospore size as a distinguishing character for

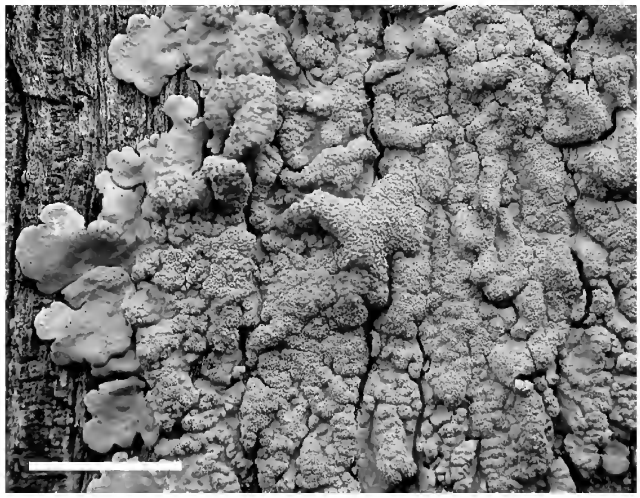

Fig. 42. *Flavoparmelia soredians*. Scale = 10 mm. Photo: J. Jarman.

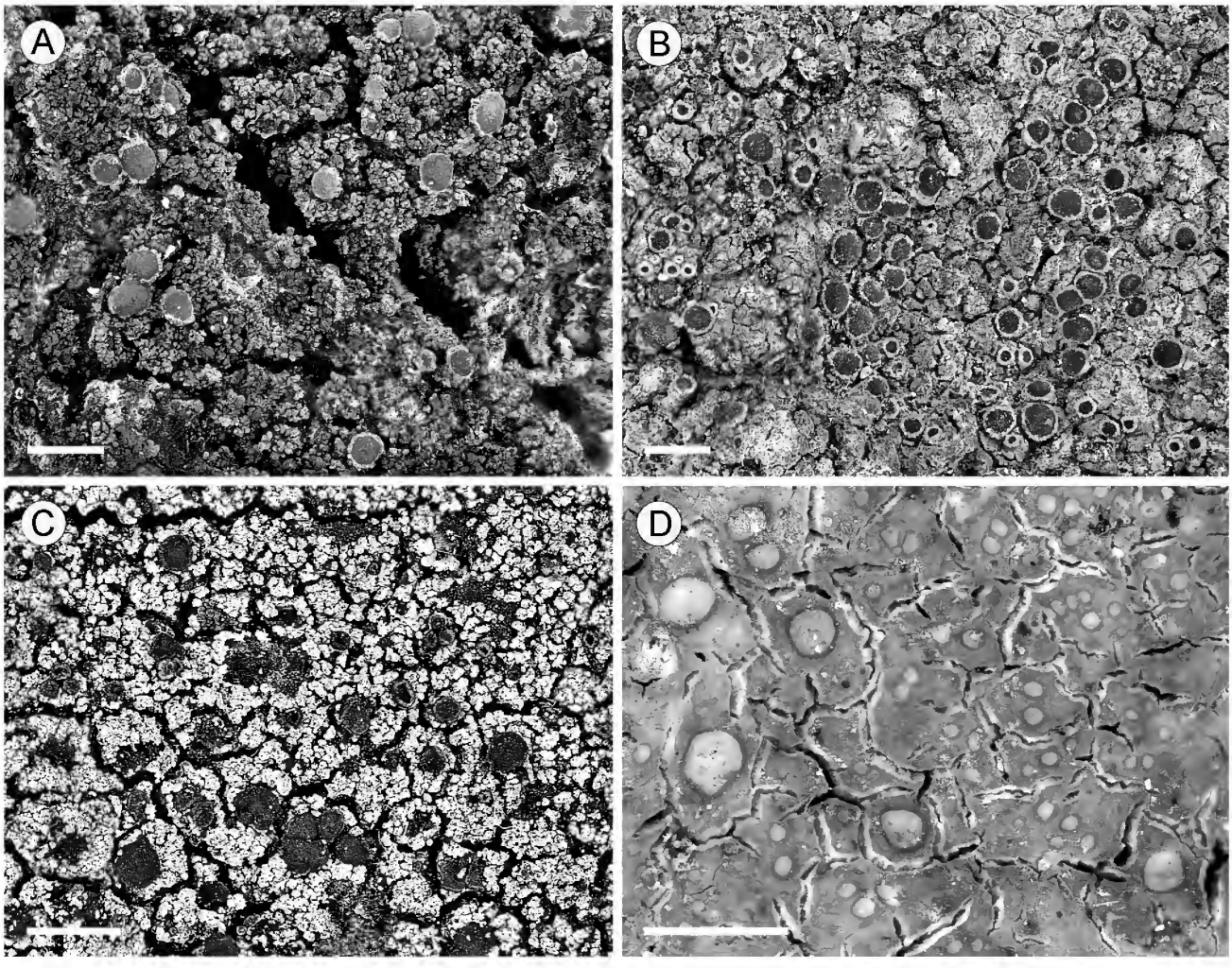

Fig. 43. A *Fuscopannaria minor*. **B** *Halecania subsquamosa*. **C** *Hertelidea pseudobotryosa*. **D** *Hymenelia lacustris*. Scales = 1 mm. Photos: J. Jarman.

this species, although I have been unable to confirm this in my own observations. *Fuscopannaria decipiens* is better recognised by having grey, incised squamules distributed over a black prothallus, apothecia with a persistent, crenulate, lecanorine margin, and ascospores 15–20 (–22) × 6–10 µm.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 784/12 (AD, HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 321/15 *& B. de Villiers* (AD, HO).

[5]*Fuscopannaria minor* (Darb.) P.M.Jørg.

On the bases of mature *Eucalyptus* and *Melaleuca* trees in moister, older mallee woodland and dry sclerophyll forest. This species is distinguished from *F. decipiens* by having a gnarled, subcrustose, dark grey to dark brown thallus, and apothecia where the disc typically becomes strongly convex and the lecanorine apothecial margin is excluded. Ascospore size was measured as 15–20 × 7–9 µm. **Fig. 43A.**

Hanson Bay Track, c. 1 km SW of Grassdale Lagoon, 36°00'S 136°52'E, 50 m alt., 2015, *G. Kantvilas* 297/15, 298/15 *& B. de Villiers* (AD, HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 322/15, 349/15 *& B. de Villiers* (AD, HO).

Glonium sp.

On loose mallee roots on the ground in rough pasture. This genus of doubtfully lichenised hysteriaceous fungi is characterised by black, aggregated, lirelliform ascomata with a carbonised, brittle excipulum, cylindrical, non-amyloid asci, branched and anastomosed paraphyses, and 1-septate, centrally-constricted, hyaline ascospores. Since this genus was brought to the attention of lichenologists by Kantvilas & Coppins (1997), many collections, probably referable to several species, have been made. The Kangaroo Island specimen is distinguished by having fusiform ascospores, 18–23 × 3–4 µm.

Slopes above Red House Bay, 35°49'S 138°07'E, 50 m alt., 2012, *G. Kantvilas* 592/12 (HO).

Gyalolechia cranfieldii (S.Y.Kondr. & Kärnefelt) Søchting, Frödén & Arup

On consolidated soil, mostly in the vicinity of limestone, in gaps in open woodland and sparse heathland; also on soft, weathered limestone in sheltered crevices and underhangs. This species is highly localised on the island, and its potential range appears to have been severely reduced by habitat degradation. All populations observed were small and extremely

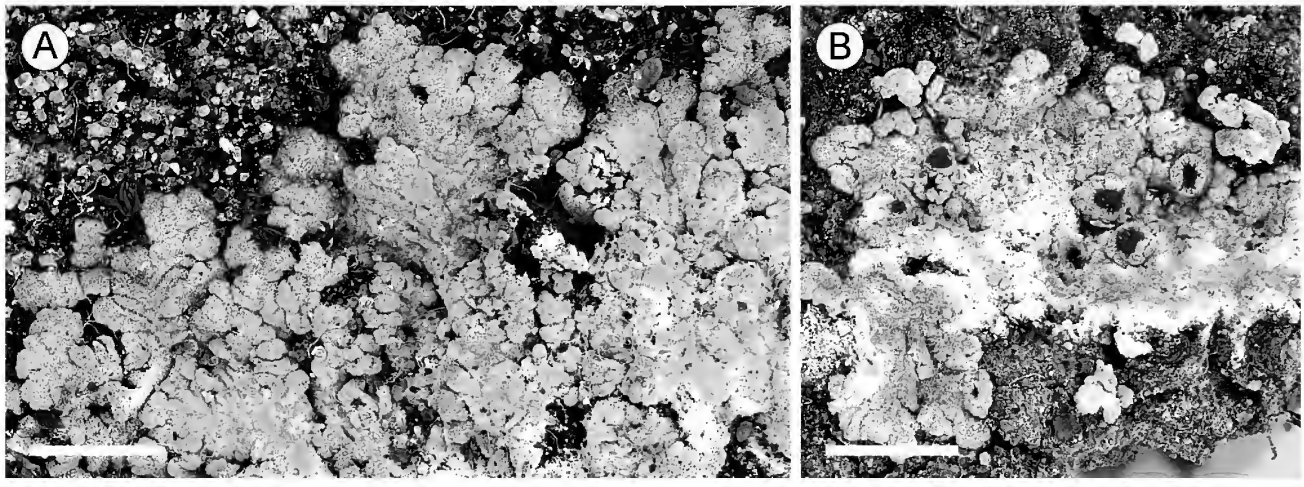

Fig. 44. *Gyalolechia* (*Fulgensia*) *cranfieldii*, showing schizidiate thallus with radiating, marginal lobes (A) and apothecia with an inrolled, crenulate thalline margin (B). Scale = 2 mm. Photos: J. Jarman.

fragmented. The genus *Gyalolechia* now accommodates all taxa previously included in *Fulgensia* (Arup *et al.* 2013). **Fig. 44.**

King George Beach (sandhills E of creek), 35°39'S 137°07'E, 1971, *G. Jackson* 814 (AD); Stokes Bay, 35°34'S 137°13'E, 1972, *R.D. Seppelt* 751B (HO); Western River, 35°43'S 136°55'E, 1974, *M. Allender s.n.* (MEL); near King George Beach, 35°39'S 137°07'E, 10 m alt., 2011, *G. Kantvilas* 333/11 *& B. de Villiers* (AD, MEL); Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 528/12 *& B. de Villiers* (HO); c. 3.5 km NE of Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 532/12 *& B. de Villiers* (AD, HO); North Cape Road, 35°36'S 137°35'E, 5 m alt., 2013, *G. Kantvilas* 257/13 *& B. de Villiers* (AD, HO); Rocky River Track, c. 1 km S of Snake Lagoon, 35°58'S 136°39'E, 50 m alt., 2015, *G. Kantvilas* 507/15 *& B. de Villiers* (HO).

[a]*Halecania spodomela* (Nyl.) M.Mayrhofer

On exposed rocks; collected twice, once from grassy woodland and again from rocks at the edge of a fresh-water stream. This is the first record of this species outside of Europe (see Fletcher & Coppins 2009b); the Kangaroo Island specimens have been compared to the type (in BM) from the United Kingdom. This species is characterised as follows: thallus crustose, thin, dark grey but mostly appearing blackish and granular due to being covered by cyanobacteria (that appear reddish in microscope preparations); apothecia black-brown to black, to 0.5 mm diam., with the disc plane or occasionally convex and the margin usually persistent; epihymenium greenish grey, N+ reddish; asci of the *Catillaria*-type; ascospores hyaline, 1-septate, halonate in water, 9–15 (–18) × 3.5–6 µm.

Ironstone Hills, 35°44'S 137°57'E, 60 m alt., 2015, *G. Kantvilas* 388/15 *& B. de Villiers* (HO); Rocky River, 35°57'E 136°40'E, 35 m alt., 2015, *G. Kantvilas* 543/15 (HO).

Halecania subsquamosa (Müll.Arg.) van den Boom & H.Mayrhofer

On non-calcareous rocks in coastal pasture and woodland. The lecanorine apothecia with a dark brown disc are very similar to those of a *Rinodina* species, but *Halecania* differs by having colourless, 1-septate, halonate ascospores, 9–16 x 3–5 µm, and *Catillaria*-type asci. In some specimens, the thalline margin of the apothecia is very reduced and best observed in thin sections. **Fig. 43B.**

Hog Bay, 3 km E of Penneshaw, 35°43'S 137°56'E, 15 m alt., 1994, *H. Streimann* 54868a (CANB); Windmill Bay, 35°51'S 138°07'E, 10 m alt., 2011, *G. Kantvilas* 412/11 (AD, HO); Ravine des Casoars, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 478/12 *& B. de Villiers* (AD, HO); Penneshaw foreshore near Frenchmans Rock, 35°43'S 137°57'E, 2 m alt., 2013, *G. Kantvilas* 196/13 (HO); Ironstone Hills, 35°44'S 137°57'E, 60 m alt., 2015, *G. Kantvilas* 386/15 *& B. de Villiers* (HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 534/15 (HO).

[s]*Hertelidea aspera* (Müll.Arg.) Kantvilas & Elix

An inconspicuous crustose species typically found on rotting wood or soil, recorded on the island from *Melaleuca* in swampy woodland. It is characterised by a granular, often abraded thallus containing perlatolic acid, red-brown to black-brown, biatorine apothecia to c. 0.5 mm wide, Pilocarpaceae-type asci and usually simple ascospores, (8–) 10–14.5 (–15) × (3–) 4–4.5 µm (Kantvilas & Elix 2005).

Lashmar Lagoon, 35°49'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 271/11 *& B. de Villiers* (AD, HO).

Hertelidea pseudobotryosa R.C.Harris, Ladd & Printzen

On bark, wood and charcoal in woodland. It differs from the preceding species chiefly by being sorediate and having smaller ascospores, (6–) 7–10 (–13) × 3–4.5 (–5) µm. Separation of the two taxa can be tricky (Kantvilas & Elix 2005). **Fig. 43C.**

About 2 km W of South West River, 35°59'S 136°50'E, 2007, *R.W. Rogers* 11498 *p.p.* (BRI); Western Cove Road, 35°44'S 137°35'E, 2 m alt., 2011, *G. Kantvilas* 308/11 (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 581/12 *& B. de Villiers* (HO); Pelican Lagoon Conservation Park, along Mitchell Drive, 35°48'S 137°48'E, 10 m alt., 2015, *G. Kantvilas* 307/15 (AD, HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas*

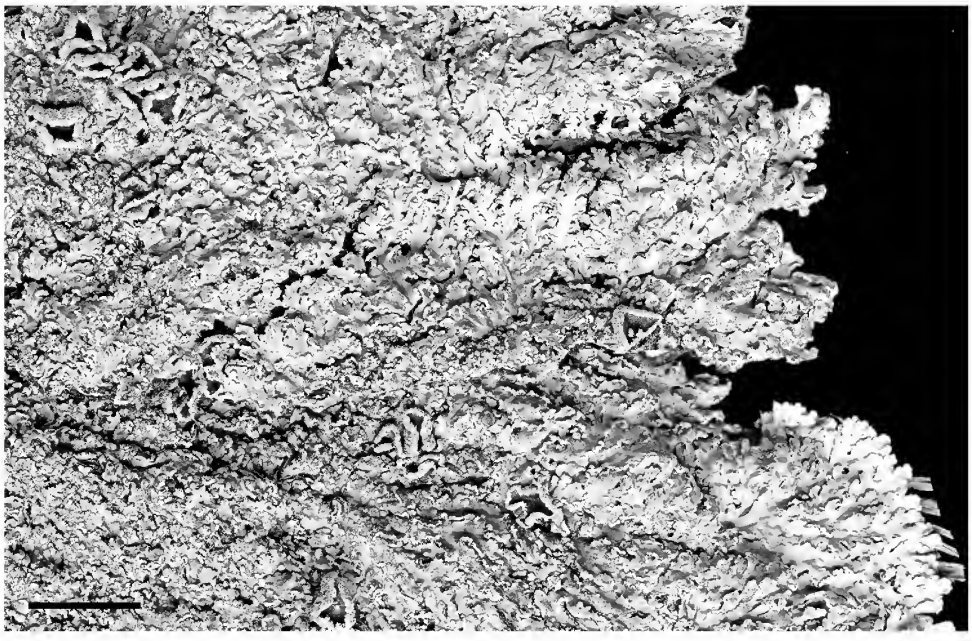

Fig. 45. *Heterodermia tremulans*. Scale = 10 mm. Photo: J. Jarman.

341/15 (AD, HO); c. 1 km SSW of Kelly Hill Caves, 36°00'S 136°54'E, 40 m alt., 2015, *G. Kantvilas* 353/15 *& B. de Villiers* (AD, HO).

Heterodermia hybocarponica Elix

On sheltered rocks, mostly near the coast. This sorediate species has an ecorticate lower surface with patchy orange-yellow pigment that reacts K– or ± brownish. **Illustration:** Elix (2010: Fig. 1).

Mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55096 (AD, CANB).

Heterodermia obscurata (Nyl.) Trevis.

On sheltered rocks, mostly near the coast. Readily distinguished from other sorediate species of the genus by the orange, K+ purple, ecorticate underside.

Mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°47'E, 20 m alt., 1994, *H.T. Lumbsch* 10922p, *A. Dickhäuser & H. Streimann* (CANB); same locality, 1994, *H. Streimann* 55060 (AD, CANB); Lesueur Conservation Park, c. 3.5 km SW of Cape Willoughby, 35°51'S 138°06'E, 10 m alt., 2009, *G. Kantvilas* 353/09 (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 330/13 *& B. de Villiers* (AD, HO).

Heterodermia tremulans (Müll.Arg.) W.L.Culb.

Locally common and widespread on rocks and trees, especially near the coast. Characterised by the labriform, marginal soredia and pale to brown, corticate lower surface. **Fig. 45.**

Northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2009, *G. Kantvilas* 361/09 (AD, HO); Harveys Return, 35°45'S 136°38'E, 100 m alt., 2010, *G. Kantvilas* 184/10 (AD, HO); Lashmar Lagoon, 35°49'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 263/11, 276/11 *& B. de Villiers* (AD, HO); Ironstone Hills, 35°43'S 137°58'E, 90 m alt., 2011, *G. Kantvilas* 315/11 (HO); northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2013, *G. Kantvilas* 265/13 (HO); Cape St Albans, 35°48'S 138°07'E, 40 m alt., 2015, *G. Kantvilas* 394/15 (HO).

Heteroplacidium contumescens (Nyl.) Breuss

Uncommon; on consolidated soil, growing amongst thalli of *Psora*, *Endocarpon* and *Placidium*. This species is superficially similar to other terricolous, squamulose taxa of the Verrucariaceae and is distinguished chiefly by having simple ascospores, arranged biseriately within clavate asci.

Lashmar Conservation Park, c. 2 km S of Cape Coutts, 35°47'S 138°04'E, 50 m alt., 2015, *G. Kantvilas* 431/15 *& B. de Villiers* (HO).

[s]*Hymenelia lacustris* (With.) M.Choisy

Highly localised on semi-submerged rocks in flowing fresh water. This pantemperate, semi-aquatic species is recognised by its pale to bright orange, crustose thallus, immersed, crater-like, aspicilioid apothecia and simple ascospores. **Fig. 43D.**

Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 546/15 (AD, HO).

Hyperphyscia adglutinata (Flörke) H.Mayrhofer & Poelt

A minute, dark olive-grey, foliose species, locally common on twigs, usually occurring in eutrophicated habitats such as on trees at the edge of sheep paddocks; also found on coastal trees and shrubs.

Pelican Lagoon, 35°49'S 137°48'E, 10 m alt., 2011, *G. Kantvilas* 279/11 (AD, HO); Creek Bay Farm, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 380/11 (AD, HO); Strawbridge Point, 35°47'S 137°47'E, 5 m alt., 2012, *G. Kantvilas* 541/12 *& B. de Villiers* (HO).

Hypocenomyce australis Timdal

On bleached eucalypt lignin in dry sclerophyll forest. This is a distinctive, pale yellowish, small squamulose lichen containing lecanoric acid (C+ red) with black, adnate apothecia that have a plane disc and flexuose margin. **Fig. 46.**

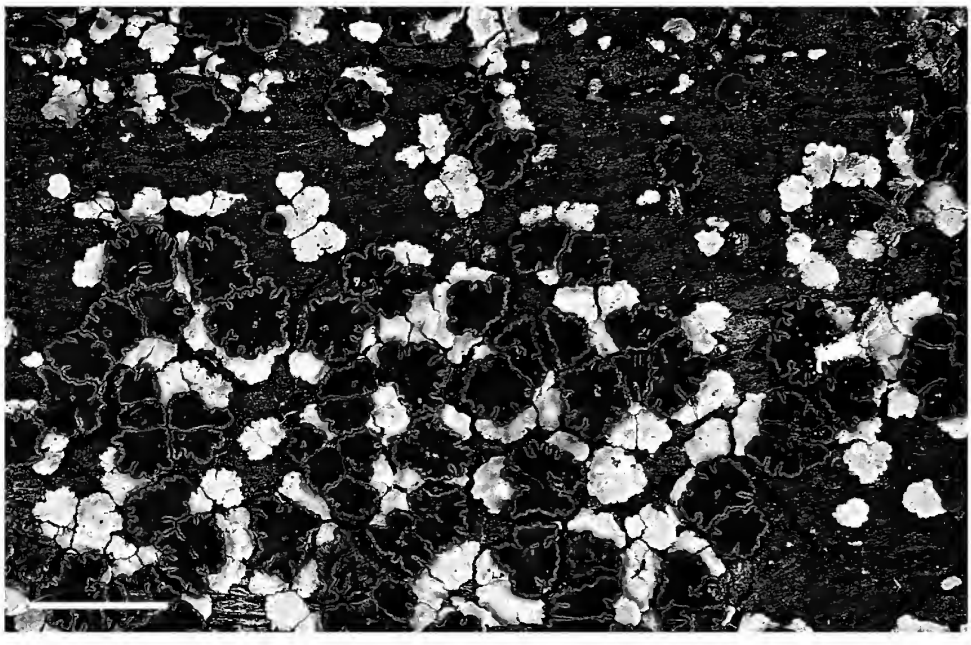

Fig. 46. *Hypocenomyce australis*. Scale = 2 mm. Photo: J. Jarman.

Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 327/15 (HO).

Hypotrachyna revoluta (Flörke) Hale

Epiphytic at the margins of mallee woodland. This species is characterised by the grey, rather elongate lobes with ascending, revolute apices and rounded soralia that become abraded and dull green to blackened. It contains gyrophoric acid (medulla C+ red). **Illustration:** Kantvilas *et al.* (2002: 56).

Hanson Bay Track, c. 1 km S of Grassdale Homestead, 36°00'S 136°52'E, 5 m alt., 2015, *G. Kantvilas* 362/15 *& B. de Villiers* (AD, HO).

[s]*Japewiella pruinosula* (Müll.Arg.) Kantvilas

Occasional on twigs in mallee woodland. The single Kangaroo Island specimen of this small, brown-fruited crustose lichen is very poorly developed and has somewhat smaller than usual ascospores (12–16 × 8–9 µm; see Kantvilas 2011). **Illustration:** Kantvilas (2011: Fig. 1).

1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuelh s.n.* (MEL 1068706 *p.p.*)

Lecania cyrtella (Ach.) Th.Fr.

On twigs of *Leucopogon parviflorus* in coastal heathland. This tiny, inconspicuous crustose lichen is typically associated with nutrient-enriched habitats. Although superficially resembling a species of *Lecanora*, it is recognised by its 1-septate ascospores, 10–16 × 3–5 µm, and *Bacidia*-type asci (see also Fletcher *et al.* 2009). **Illustration:** Lumbsch *et al.* (2001: 12).

Ravine des Casoars, 35°48'S 136°35'E, 5 m alt., 2012, *G. Kantvilas* 445/12 (AD, HO).

Lecania inundata (Hepp ex Körb.) M.Mayrhofer

On coastal laterite, often in sites subject to eutrophication by birds. The pale grey, areolate thallus, and the apothecia with a thin, thalline margin are suggestive of a species of *Rinodina*, but this species has hyaline, (0–) 1-septate ascospores, 10–19 × 4–7 µm, and *Bacidia*-type asci (Kantvilas & van den Boom 2015). **Fig. 47A.**

Northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2013, *G. Kantvilas* 270/13 (herb. v.d.Boom, HO); same locality, 2015, *G. Kantvilas* 476/15 (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 2 m alt., 2013, *G. Kantvilas* 333/13 *& B. de Villiers* (herb. v.d.Boom, HO).

[a]*Lecania koerberiana* Lahm

On *Melaleuca* in coastal woodland. Characterised by a scurfy, pale greyish, crustose thallus, apothecia initially with an incomplete thalline margin, soon becoming biatorine, a brown to blackish, sometimes piebald disc, simple, capitate paraphyses, *Bacidia*-type asci, (0–1–) 3-septate ascospores, 12–17 × 5–6 µm, and thread-like conidia, 15–20 µm long.

West Bay, 35°53'S 136°33'E, 10 m alt., 2011, *G. Kantvilas* 300/11 (herb. v.d.Boom, HO).

[T]*Lecania maritima* Kantvilas & van den Boom

On limestone boulders in rough pasture. Characterised by the indistinct, endolithic thallus, biatorine, grey-pruinose apothecia with a prominent, persistent proper excipulum that is opaque red-brown in section, *Bacidia*-type asci, and 1-septate, ellipsoid ascospores, 10–15 (–16) × 4.5–6 µm (Kantvilas & van den Boom 2015). It is also known from Flinders Island in Bass Strait. **Fig. 47B.**

Pelican Lagoon, 35°48'S 137°48'E, 20 m alt., 2012, *G. Kantvilas* 414/12 *& B. de Villiers* (herb. v.d.Boom, HO); near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 281/13 (AD, herb. v.d.Boom, HO); Stokes Bay, 35°37'S 137°13'E, 60 m alt., 2013, *G. Kantvilas* 302/13, 303/13 *& B. de Villiers* (AD, herb. v.d.Boom, HO); Red House Bay, 35°49'S 138°06'E, 15 m alt., 2013, *G. Kantvilas* 310/13 *p.p.* (HO).

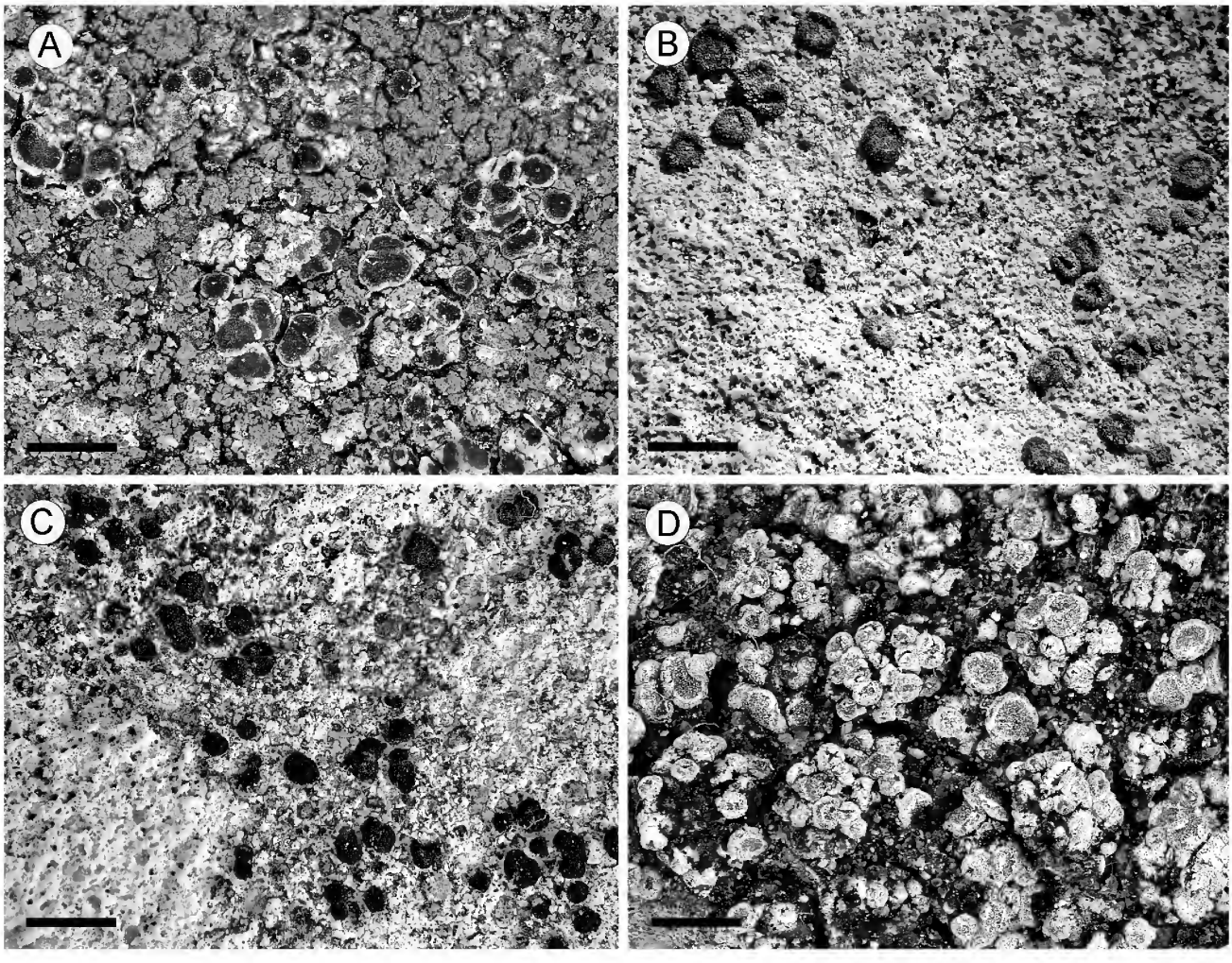

Fig. 47. A *Lecania inundata*. **B** *Lecania maritima*. **C** *Lecania polycarpa*. **D** *Lecania turicensis*. Scales = 1 mm. Photos: J. Jarman.

Lecania polycarpa (Müll.Arg.) Kantvilas & van den Boom

On limestone, in coastal heathland or rough, stony paddocks. Characterised by the numerous, black, scattered apothecia, at most with a sparse, discontinuous grey pruina, which stand out starkly against the white limestone substratum, the lack of any detectable thallus, and, anatomically, by the absence of photobiont cells in the apothecial margin, the *Bacidia*-type asci and the (0–) 1-septate ascospores, 10–14.5 (–15) × 4–5.5 (–6) µm (Kantvilas & van den Boom 2015). **Fig. 47C.**

Point Ellen, 36°00'S 137°11'E, 5 m alt., 2013, *G. Kantvilas* 215/13 (HO); near Pelican Lagoon, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 285/13 (herb. v.d.Boom, HO); Red House Bay, 35°49'S 138°06'E, 15 m alt., 2013, *G. Kantvilas* 307/13 (AD, herb. v.d.Boom, HO).

Lecania turicensis (Hepp) Müll.Arg.

On limestone outcrops in rough sheep pasture, degraded woodland and heathland. Characterised by a pale grey, granular-areolate thallus with greyish-pruinose, lecanorine apothecia in which the thalline margin often becomes excluded. **Fig. 47D.**

Windmill Bay, 35°51'S 138°07'E, 20 m alt., 2012, *G. Kantvilas* 477/12 (herb. v.d.Boom, HO); Penneshaw foreshore near Frenchmans Rock, 35°43'S 137°57'E, 2 m alt., 2013, *G. Kantvilas* 193/13 (herb. v.d.Boom, HO); Cape Willoughby, 35°51'S 138°08'E, 10 m alt., 2013, *G. Kantvilas* 244/13, 245/13 *& B. de Villiers* (AD, herb. v.d.Boom, HO); Stokes Bay, 35°37'S 137°13'E, 60 m alt., 2013, *G. Kantvilas* 304/13 *& B. de Villiers* (herb. v.d.Boom, HO); Red House Bay, 35°49'S 138°06'E, 15 m alt., 2013, *G. Kantvilas* 311/13 (herb. v.d.Boom, HO).

Lecanora andina Räsänen

On eucalypt twigs in mallee woodland. This small crustose species has a whitish thallus containing atranorin only, and apothecia with a red-brown epruinose disc, large, KOH-insoluble crystals in the margin, but lacking crystals in the epihymenium.

Hog Bay Road, 35°46'S 137°37'E, 20 m alt., 2013, *G. Kantvilas* 209/13 (HO).

Lecanora caesiorubella Ach.

On smooth-barked twigs in mallee woodland. Recognised by the whitish grey thallus (usually P+ orange-red) and whitish pink, pruinose apothecia. **Illustration:** McCarthy & Mallet (2004: pl. 18).

Flinders Chase area, 1945, *J.B. Cleland s.n.* (AD); Beyeria Conservation Park 35°47'S 137°36'E, 50 m alt., 2010, *G. Kantvilas* 213/10 (AD, HO).

[s]*Lecanora casuarinophila* Lumbsch

Uncommon; collected in remnant *Callitris* woodland and from coastal laterite outcrops, an unusual substratum for this normally corticolous lichen. This species is characterised by a totally leprose or coarsely sorediate, greenish grey thallus containing atranorin and zeorin (Lumbsch & Elix 2004).

Northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2009, *G. Kantvilas* 365/09 (HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 436/12 *& B. de Villiers* (HO).

Lecanora crenulata (Dicks.) Hook.

On limestone. Distinguished from the superficially similar *L. dispersa* (below) by having apothecia with a coarsely grey-pruinose disc and a crenulate, scabrid, radially fissured thalline margin (Edwards *et al.* 2009). Lumbsch & Elix (2004) did not accept this species for Australia although it was cited in earlier accounts (e.g. McCarthy 2003a) as occurring in Victoria, South Australia and Tasmania. **Fig. 48A.**

Windmill Bay, 35°51'S 138°07'E, 10 m alt., 2013, *G. Kantvilas* 236/13A *& B. de Villiers* (AD, HO); Cape Willoughby, 35°51'S 138°08'E, 10 m alt., 2013, *G. Kantvilas* 243/13 *& B. de Villiers* (HO).

Lecanora dispersa (Pers.) Sommerf.

On rocks and wood, often associated with eutrophicated conditions. This variable species is characterised by an inconspicuous to ± absent thallus and scattered apothecia with a whitish grey margin and pinkish brown disc. It is rather more widespread than the specimens cited indicate, as its scattered apothecia are seen frequently on specimens of other taxa. **Illustration:** McCarthy & Mallet (2004: pl. 10).

Mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°47'E, 20 m alt., 1994, *H.T. Lumbsch* 10922c *p.p., A. Dickhäuser & H. Streimann* (CANB); Cape St Albans, 35°48'S 138°08'E, 40 m alt., 2011, *G. Kantvilas* 364/11 (HO); W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 502/12 (HO); Penneshaw foreshore near Frenchmans Rock, 35°43'S 137°57'E, 2 m alt., 2013, *G. Kantvilas* 195/13 (AD, HO); northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2013, *G. Kantvilas* 271/13 (HO).

Lecanora elapheia Stizenb.

On *Melaleuca* bark in scrubby woodland near the coast. Similar to *L. andina* in its whitish thallus and red-brown apothecial disc, this species differs by having small, KOH-soluble crystals in the apothecial margin, and by containing unknown terpenes in addition to atranorin.

Muston, 35°49'S 137°45'E, 10 m alt., 2011, *G. Kantvilas* 278/11 (F, HO); Stokes Bay, 35°37'S 137°13'E, 60 m alt., 2013, *G. Kantvilas* 290/13 *& B. de Villiers* (HO).

Lecanora farinacea Fée

Locally common on non-calcareous rocks in dry sclerophyll forest. When well-developed, this species forms extensive, conspicuous, whitish grey thalli with scattered, concolorous, grey-pruinose apothecia; it typically contains atranorin and norstictic acid (K+ yellow→red). **Illustration:** McCarthy & Mallet (2004: pl. 9).

Waterfall Creek, 30 km ENE of Cape Borda, 35°42'S 136°54'E, 140 m alt., 1994, *H. Streimann* 54945, 54947, 54948, 54950 (CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55080, 55085, 55086, 55089 (CANB); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 553/12 *& B. de Villiers* (AD, HO); Cannery Walking Track, American River, 2013, *A. Wells s.n.* (HO).

Lecanora flavidomarginata B. de Lesd.

On young branches of *Allocasuarina* in woodland. The lecanorine apothecia with a prominent thalline margin and pinkish, white-pruinose disc somewhat resemble those of a species of *Ochrolechia*, but this species can be distinguished chemically (it is C– and contains zeorin with traces of atranorin and usnic acid) and by its relatively small ascospores (11.5–14.5 × 6–7.5 µm) (Lumbsch & Elix 2004). **Fig. 48B.**

S of Wisanger Hills Homestead, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19652 *& L.H. Elix* (CANB); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 323/15 *& B. de Villiers* (AD, HO).

[s]*Lecanora flavopallida* Stirt.

Very common in coastal vegetation on twigs and small diameter tree trunks. Easily recognised by the pale greyish to yellowish crustose thallus and by the apothecia with pale brownish disc and whitish margin that often becomes excluded. **Fig. 48C.**

Clay pan, c. 4 km ESE of car park at West Bay, 35°54'S 136°35'E, 1982, *K. Stove* 1677 *p.p.* (AD); Cape Gantheaume Conservation Park, c. 2 km S of entrance, 36°00'S 137°36'E, 1982, *K. Stove* 4363 (AD); adjacent to Eleanor River, 3 km E of Little Sahara dunes, 35°57'S 137°17'E, 1989, *D.N. Kraehenbuehl* 5181 *p.p.* (AD); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 415/12 *& B. de Villiers* (AD, HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 347/15 *& B. de Villiers* (AD, HO); c. 1.5 km SW of Point Ellen, 36°00'S 137°11'E, 10 m alt., 2015, *G. Kantvilas* 446/15 (AD, HO).

Lecanora galactiniza Nyl.

On hard, non-calcareous rocks, especially granite, near the coast. Very similar to *L. pseudistera* (see below) and likewise with large crystals in the apothecial margin but differing by containing atranorin only, and by having numerous, small, KOH-soluble crystals in the epihymenium (Lumbsch & Elix 2004).

Windmill Bay, 35°51'S 138°07'E, 20 m alt., 2012, *G. Kantvilas* 468/12 (HO); Eastern Cove, c. 2.5 km NE of American River, 35°46'S 137°47'E, 2 m alt., 2015, *G. Kantvilas* 490/15 (AD, HO).

[s]*Lecanora helva* Stizenb.

On *Callitris* in relict coniferous woodland. Characterised by containing atranorin and 2'-*O*-methylperlatolic acid, and by having apothecia with large, KOH-insoluble crystals in the margin, and small crystals that dissolve yellowish in KOH in the epihymenium.

Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 426/12 *& B. de Villiers* (AD, HO).

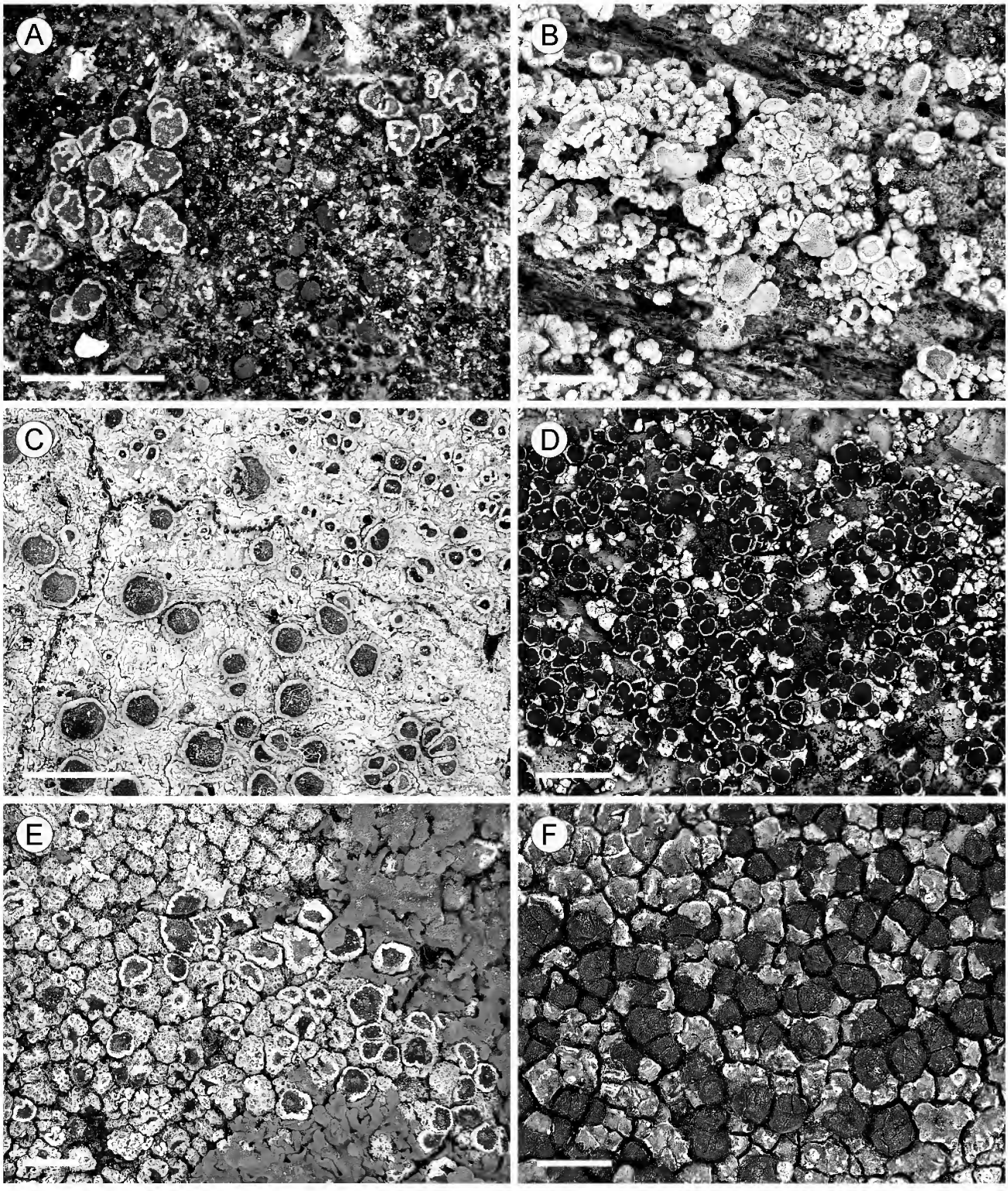

Fig. 48. A *Lecanora crenulata*. **B** *Lecanora flavidomarginata*. **C** *Lecanora flavopallida*. **D** *Lecanora pseudistera*. **E** *Lecanora sphaerospora*, growing together with the orange thallus of *Xanthoria ligulata*. **F** *Lecidea capensis*. Scales = 2 mm. Photos: J. Jarman.

[5]*Lecanora mobergiana* Lumbsch & Elix

On sandstone in dry sclerophyll forest and mallee woodland. This species is found mostly sterile or at best only sparingly fertile, and is characterised by the dull grey-green, areolate thallus with conspicuous, pale yellowish to yellowish green, orbicular soralia to 1–1.5 mm wide that are initially discrete but eventually coalesce; it contains atranorin and usnic acid.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 555/12; same locality, 2012, *G. Kantvilas* 767/12 *& B. de Villiers* (HO); Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 373/13 (AD, HO).

Lecanora pseudistera Nyl.

Locally common on exposed, non-calcareous rocks or, less commonly, consolidated soil, especially near the coast, where it forms conspicuous whitish thalli with

abundant apothecia with a red-brown disc and whitish margin. It is characterised by containing atranorin and 2'-*O*-methylperlatolic acid, and by having apothecia with large, KOH-insoluble crystals in the margin, and a non-granular epihymenium. In Tasmania, the thallus of this species is sometimes infected with the tiny, black apothecia of the parasite *Tephromela campestricola* (Nyl.) Rambold & Triebel (Kantvilas 2015). **Fig. 48D.**

Mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55102 *p.p.* (CANB); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 403/11 (AD, HO); same locality, 2015, *G. Kantvilas* 473/15, 473/15A (HO); Windmill Bay, 35°51'S 138°07'E, 10 m alt., 2011, *G. Kantvilas* 411/11 (AD, HO); Western River Cove, summit of cliffs E of beach, 35°40'S 136°58'E, 50 m alt., 2015, *G. Kantvilas* 401/15, 405/15 (AD, HO).

Lecanora saligna (Schrad.) Zahlbr.

On bleached eucalypt wood, such as old fenceposts, exposed mallee roots or logs, in rough pasture, woodland and forest. Characterised by an inconspicuous, rather dispersed thallus containing isousnic acid, and by red-brown apothecia in which the margin contains small, KOH-soluble crystals and becomes ± excluded with age.

13 km NE of Vivonne Bay, 32°52'S 137°16'E, 60 m alt., 1985, *J.A. Elix* 19577 *& L.H. Elix* (CANB); Creek Bay Farm, 35°51'S 138°06'E, 100 m alt., 2011, *G. Kantvilas* 419/11 (HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 330/15, 344/15 (AD, HO).

Lecanora sphaerospora Müll.Arg.

Very common on limestone. Together with *Buellia albula*, this species contributes to the distinctive white colour of limestone outcrops. It has characteristic, grey-pruinose apothecia. **Fig. 48E.**

Cape Du Couedic, 36°03'S 136°42'E, 80 m alt., 1985, *J.A. Elix* 19618 *& L.H. Elix* (CANB); Stokes Bay, 35°37'S 137°12'E, 2 m alt., 1985, *J.A. Elix* 19655 *& L.H. Elix* (CANB); Cape Borda, 35°45'S 136°35'E, 100 m alt., 1994, *H. Streimann* 54957 (AD, CANB); same locality, 2010, *G. Kantvilas* 187/10 (AD, HO); Cape St Albans, 35°488'S 138°07'E, 20 m alt., 2010, *G. Kantvilas* 171/10 (AD, HO); Ravine des Casoars, 35°48'S 136°35'E, 5 m alt., 2012, *G. Kantvilas* 447/12 (AD, HO); c. 3.5 km NE of Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 531/12 (AD, HO); Cape Willoughby, 35°51'S 138°08'E, 10 m alt., 2013, *G. Kantvilas* 240/13 *& B. de Villiers* (AD, HO); near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 276/13 (AD, HO).

[5]*Lecanora subtecta* (Stirt.) Kantvilas & LaGreca

On twigs and decorticated wood in exposed habitats in inland areas. This species is recognised by its esorediate, glaucous grey, rather inapparent thallus containing usnic acid and zeorin, the orange-pink to yellowish, biatorine apothecia, typically with a lemon-yellow pruina, and ascospores 8–15 × 3–5 (–5.5) µm. **Illustration:** Kantvilas & LaGreca (2008: Fig. 1).

Mt Taylor Conservation Park, hillside near cave, 35°56'S 137°03'E, 1982, *K. Stove* 1755 *p.p.* (AD, HO); 13 km NE of Vivonne Bay, 32°55'S 137°16'E, 60 m alt., 1985, *J.A. Elix* 19578, 19580 *& L.H. Elix* (CANB).

Lecanora symmicta (Ach.) Ach.

On eucalypt wood in pasture. Characterised by a yellowish green, leprose-sorediate thallus containing usnic acid and zeorin, biatorine, epruinose, milky white apothecia, and ascospores 11–16 × 4–6 µm. This species is closely related to *L. subtecta* (see above), and variation in the group is discussed by Kantvilas & LaGreca (2008).

Ravine des Casoars, 6 km SE of Cape Borda, 1994, *H.T. Lumbsch* 10906c, *A. Dickhäuser & H. Streimann* (herb. Lumbsch); Creek Bay Farm, 35°50'S 138°06'E, 65 m alt., 2013, *G. Kantvilas* 361/13 (AD, HO).

Lecidea capensis Zahlbr.

On consolidated soil and stones. Recognised by the pale brown thallus of contiguous, rather angular, subsquamulose areoles containing 2'-*O*-methylperlatolic acid, with sessile to subimmersed, black apothecia (see Rambold 1989). **Fig. 48F.**

Western River Cove, summit of cliffs E of beach, 35°40'S 136°58'E, 50 m alt., 2015, *G. Kantvilas* 402/15 (AD, HO).

Lecidea fuscoatrula Nyl.

On sandstone in dry sclerophyll forest. Distinguished from several superficially similar species (see Rambold 1989) by the I+ violet medulla and the presence of 2'-*O*-methylmicrophyllinic acid (visible as a bright UV+ blue spot on developed t.l.c. plates). **Illustration:** Lumbsch *et al.* (2001: 32).

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 777/12 *& B. de Villiers* (HO); Lathami Conservation Park, 35°38'S 137°14'E, 160 m alt., 2015, *G. Kantvilas* 294/15 *& B. de Villiers* (HO).

Lecidea ochroleuca Pers.

On consolidated soil and rock in mallee woodland. Rambold (1989) discussed this species and the related *L. terrena* (see below). He noted that although morphologically and anatomically indistinguishable, *L. ochroleuca* occurs mainly on soil and contains gyrophoric acid, whereas *L. terrena* occurs mostly on rock and contains confluentic acid; specimens lacking lichen substances were determined on the basis of substratum. This approach is essentially followed here except that, in my opinion, the substratum offers little insight into which species is present, and all specimens examined contained lichen substances, albeit often only in trace concentrations.

Murray Lagoon, 23 km SE of Parndana, 35°55'S 137°25'E, 20 m alt., 1985, *J.A. Elix* 19605 *& L.H. Elix* (CANB); South Coast Road, 35°51'S 137°28'E, 30 m alt., 2013, *G. Kantvilas* 224/13 (AD, HO).

Lecidea sarcogynoides Körb.

On rocks in rough pasture. The Kangaroo Island specimens accord well with the general concept of this cosmopolitan species, especially with respect to the dilute crimson hymenium, the excipulum with an opaque crimson-black outer edge but hyaline to dilute crimson

within, the brown-black hypothecium and rather oblong ascospores (see Aptroot *et al.* 2009), but differ in having an unusually thick, pale beige-brown thallus.

S of Wisanger Hills Homestead, 7 km WSW of Emu Bay, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19647 *& L.H. Elix* (CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°47'E, 20 m alt., 1994, *H.T. Lumbsch* 10922e, *A. Dickhäuser & H. Streimann* (CANB); Cape Willoughby Road, 35°50'S 138°06'E, 110 m alt., 2011, *G. Kantvilas* 324/11 (HO, MSC); c. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 60 m alt., 2011, *G. Kantvilas* 352/11 (AD, HO, MS).

Lecidea terrena Nyl.

On consolidated soil and non-calcareous rocks in dry sclerophyll woodland. The presence of confluentic acid (often only in trace amounts) separates this species from the related *L. ochroleuca* (see above and Rambold 1989).

Scotts Cove Lookout, 3 km E of Cape Borda, 35°46'S 136°37'E, 120 m alt.,1985, *J.A. Elix* 19720 *& L.H. Elix* (CANB); Rocky River, 35°58'S 136°39'E, 40 m alt., 1994, *H. Streimann* 55030 (CANB).

Lecidella destituta Kantvilas & Elix

Rather common and widespread on twigs in heathland and mallee where it occurs as part of a diverse community of crustose lichens, including superficially similar but unrelated taxa such as *Buellia dissa* and species of *Bacidia*. Characterised by containing atranorin only (other species of the genus typically contain xanthones and are C+ orange) and by having a hymenium inspersed with oil droplets and crystals. **Illustration:** Kantvilas & Elix (2013: Fig. 1A).

End of Old Bullock Track, 35°39'S 137°38'E, 1967, *G. Jackson* 533 (AD); corner of Playford Hwy, Birchmore Hwy and road to Kingscote aerodrome, 35°42'S 137°31'E, 1982, *K. Stove* 1789 *p.p.* (AD); 3 km E of Seal Bay, 36°00'S 137°21'E, 30 m alt., 1985, *J.A. Elix* 19589 *& L.H. Elix* (CANB, HO); Weir Cove, 2 km E of Cape de Couedic, 36°03'S 136°43'E, 40 m alt., 1994, *H. Streimann* 54981 (CANB, HO); West Bay, 35°53'S 136°33'E, 10 m alt., 2011, *G. Kantvilas* 297/11 (AD, HO).

Lecidella enteroleucella (Nyl.) Hertel

On rocks in *Allocasuarina* woodland. The single Kangaroo Island specimen is a tiny fragment but nevertheless displays the diagnostic features of this species: a pale yellowish, rimose-areolate thallus containing atranorin, arthothelin and thuringione, and apothecia with a colourless hypothecium. On Kangaroo Island, the presence of atranorin helps distinguish this species from *L. granulosa* (Kantvilas & Elix 2014).

Ironstone Hills, 35°44'S 137°57'E, 70 m alt., 2015, *G. Kantvilas* 375/15 (AD, HO).

Lecidella flavovirens Kantvilas & Elix

Occasional on wood and bark in mallee woodland and dry sclerophyll forest, especially on *Banksia*. This species is most frequently encountered as a sterile, yellowish, sorediate crust containing xanthones (C+ orange). **Fig. 49A.**

Creek Bay Farm, headwaters of Lubra Creek, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 374/11, 377/11 (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 575/12, 585/12 *& B. de Villiers* (AD, HO); c. 1 km SSW of Kelly Hill Caves, 36°00'S 136°54'E, 40 m alt., 2015, *G. Kantvilas* 357/15 *& B. de Villiers* (AD, HO).

Lecidella granulosula (Nyl.) Knoph & Leuckert var. *granulosula*

On rocks, especially in sheltered overhangs. Distinguished from other saxicolous species of the genus chiefly by having a granular thallus containing xanthones (C+ orange) and a colourless or pale hypothecium. **Fig. 49B.**

Northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 399/11 (HO); Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 365/13 (HO); Ironstone Hills, 35°44'S 137°57'E, 70 m alt., 2015, *G. Kantvilas* 377/15 (AD, HO); Western River Cove, E of beach, 35°41'S 136°58'E, 20 m alt., 2015, *G. Kantvilas* 407/15 (AD, HO).

T*Lecidella granulosula* var. *lecanorina* Kantvilas & Elix

In sheltered microhabitats on coastal rocks or on outcrops in mallee woodland. It differs from variety *granulosula* chiefly by having a colourless (instead of black) apothecial margin (Kantvilas & Elix 2014). Also known from the south coast of New South Wales. **Fig. 49C.**

Northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2013, *G. Kantvilas* 264/13 (HO); Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 375/13 (HO) [type].

T*Lecidella leucomarginata* Kantvilas & Elix

Known from a bleached, dead, remnant stag of a *Melaleuca* in a highly degraded salt marsh. Also recorded from south-western Western Australia (Kantvilas & Elix 2014). This species is distinguished by its yellowish, esorediate thallus and by its distinctive apothecia that have a colourless, almost translucent proper margin. **Fig. 49D.**

Western Cove, 35°44'S 137°35'E, 0.5 m alt., 2013, *G. Kantvilas* 234/13 (AD, BM, HO) [type].

Lecidella sublapicida (C.Knight) Hertel

On rocks, often in eutrophicated conditions. Characterised by the dark brown to yellow-brown hypothecium, in combination with the presence of vicanicin. **Fig. 49E.**

Northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 401/11 (HO); Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 371/13 (HO).

Lecidella xylogena (Müll.Arg.) Kantvilas & Elix

A tiny, inconspicuous, easily-overlooked crustose lichen occurring on twigs, branches and standing dead trunks of eucalypts in mallee woodland and dry sclerophyll forest. Distinguished best in thin apothecial sections by the paraphyses that have internally pigmented, clavate apices. **Fig. 49F.**

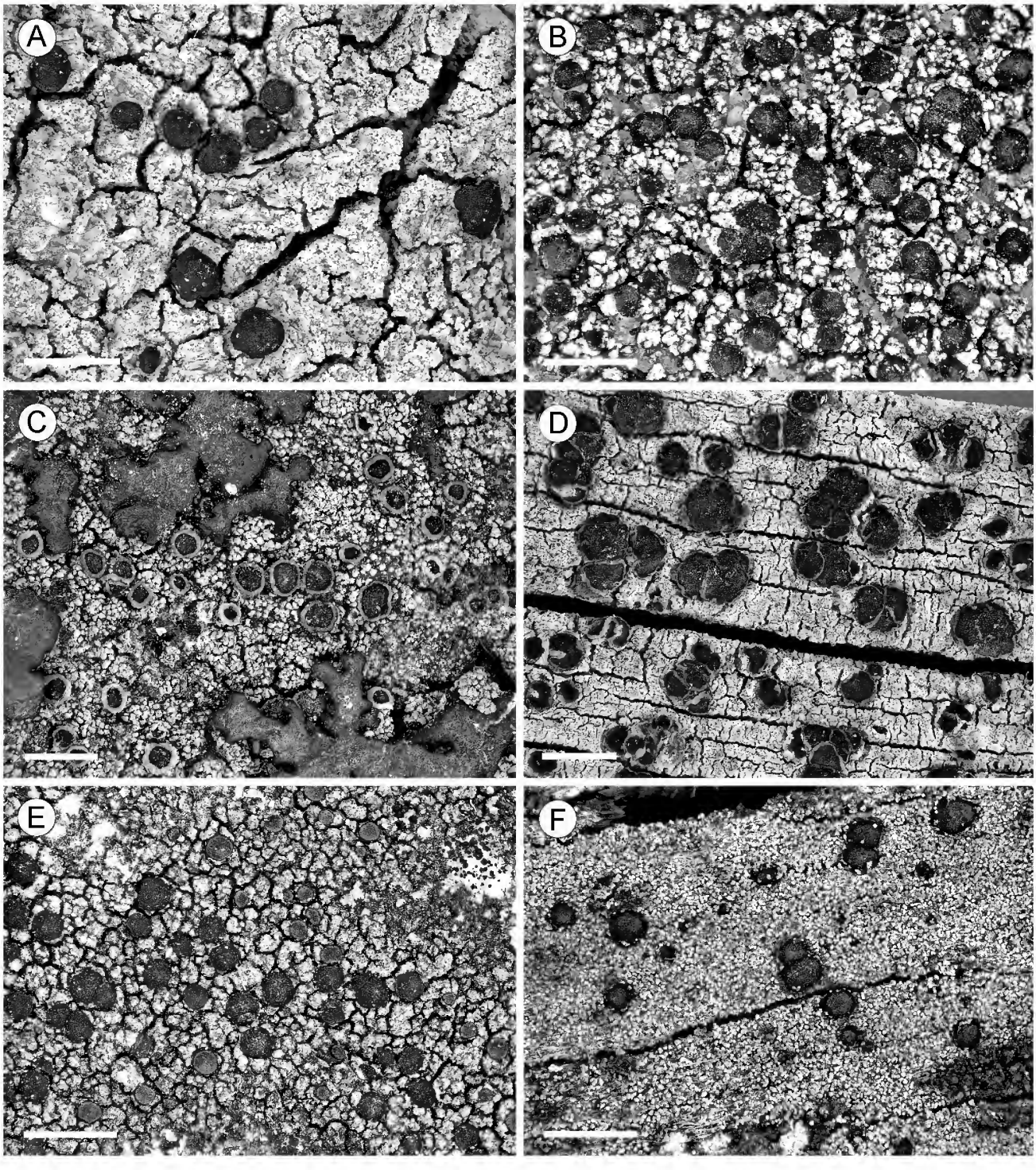

Fig. 49. A *Lecidella flavovirens*. **B** *Lecidella granulosula* var. *granulosula*. **C** *Lecidella granulosula* var. *lecanorina*. **D** *Lecidella leucomarginata*. **E** *Lecidella sublapicida*. **F** *Lecidella xylogena*. Scales = 1 mm. Photos: J. Jarman.

Mt Taylor Conservation Park, 35°56'S 137°03'E, 1982, *K. Stove* 1755 *p.p.* (AD); Creek Bay Farm, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 382/11 (HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 586/12 *& B. de Villiers* (HO).

[s]*Leimonis erratica* (Körb.) R.C.Harris & Lendemer

On stones on the ground in dry sclerophyll forest. Characterised by scattered, black apothecia to c. 0.5 mm wide, with a persistent margin and plane disc, a greenish, N+ crimson-red epihymenium, brown hypothecium, asci of the Pilocarpaceae-type, and simple ascospores, (5–) 6–8 (–9) x 3–3.5 (–4) µm (Harris 2009). Although apothecia are usually abundant, well-formed asci with ascospores tend to be relatively few.

Rocky River Track, 35°57'S 136°40'E, 40 m alt., 2015, *G. Kantvilas* 522/15 (HO).

Lepra erubescens (Hook.f. & Taylor) A.W.Archer & Elix

On sandstone in dry sclerophyll forest. Characterised by a brownish or olive-grey, sometimes rather papillate

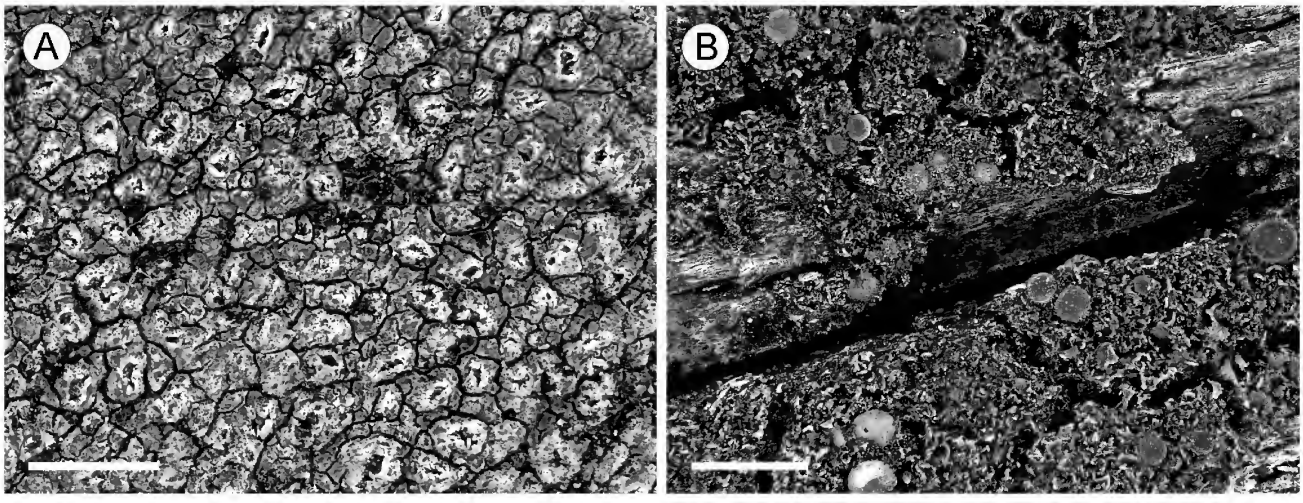

Fig. 50. A *Lepra erubescens*. **B** *Leptogium pecten*. Scales = 2 mm. Photos: J. Jarman.

thallus containing norstictic and connorstictic acids, immersed, rather deformed, disciform apothecia, a brownish, K+ crimson epihymenium, 8-spored asci, ellipsoid ascospores, 26–44 × 14–26 µm, and filiform conidia, 20–25 µm long. Until recently, this species was included within a broad concept of the genus *Pertusaria*. Recent work (Wei *et al.* 2017) has seen the transfer of taxa with disciform apothecia to the genus *Lepra* (see also Archer & Elix 2018). **Fig. 50A.**

Mouth of De Mole River, 35°43'S 136°46'E, 1994, *H. Streimann* 55081 (CANB); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 557/12, 757/12 *& B. de Villiers* (HO).

[5]*Lepra leucosorodes* (Nyl.) I.Schmitt, Hodkinson & Lumbsch

Recorded from a rotting log in mallee woodland. Characterised by a white, crustose thallus containing thamnolic acid and lichexanthone, and the flattened, roundish soralia to 1.5 mm wide. Previously referred to in Australian literature as *Pertusaria scaberula* A.W.Archer, but that name was placed in synonymy with *P. leucosorodes* by Archer & Elix (2016). **Illustration:** Archer & Elix (2016: Fig. 64).

The old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 358/13 *& B. de Villiers* (AD, HO).

[5]*Lepra subventosa* (Malme) I.Schmitt & Lumbsch var. *subventosa*

On sea-shore rocks at the margins of eucalypt woodland. Characterised by the thick, whitish, crustose thallus containing thamnolic acid (K+ yellow) and lichexanthone (UV+ yellow), and the rather stipitate soralia. Until recently included within a broad concept of the genus *Pertusaria*.

The old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 335/13 *& B. de Villiers* (AD, HO).

Lepraria coriensis (Hue) Sipman

Rather common on consolidated soil, especially near the coast, typically in sheltered rock crevices but rarely also on the ground where it is associated with species of *Psora* and *Diploschistes*. Species of *Lepraria* have a powdery, sterile thallus; this species is one of the few yellowish species and contains usnic acid and zeorin. It also tends to have a minutely lobed thallus margin (Elix 2009a).

Lesueur Conservation Park, c. 3.5 km SW of Cape Willoughby, 35°51'S 138°06'E, 10 m alt., 2009, *G. Kantvilas* 356/09, 357/09 (AD, HO); Harveys Return, 35°45'S 136°38'E, 10 m alt., 2010, *G. Kantvilas* 183/10 (AD, HO); near King George Beach, 35°39'S 137°07'E, 10 m alt., 2011, *G. Kantvilas* 335/11 *& B. de Villiers* (HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 540/15 (HO).

Lepraria finkii (B. de Lesd.) R.C.Harris

On the trunks of grass trees (*Xanthorrhoea*) in dry sclerophyll forest and, less commonly, on soil and detritus. Characterised chemically by the presence of atranorin and zeorin, together with stictic and constictic acids. Until the monograph of Lendemer (2013), this species was referred to by most authors in Australasia as *L. lobificans* Nyl.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 589/12 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 325/13 *& B. de Villiers* (HO); same locality, 2015, *G. Kantvilas* 484/15 (AD, HO).

Leptogium aff. *biatorinum* (Nyl.) Leight.

According to its label, this unusual specimen was collected from sandstone amongst *Olearia* shrubs on sand dunes. The determination is tentative because the specimen consists of only a few thallus and rock fragments from which it is hard to reconstruct the overall appearance of the species. It has the following salient characters: thallus subsquamulose, with minute lobes c. 0.1–0.2 mm wide; apothecia 0.8–1.2 mm wide, with disc red-brown, plane or convex, with an excluded margin; ascospores submuriform, 24–32 × 10–15 µm, mostly ellipsoid but occasionally centrally constricted or attenuated at one end, with 3 transverse and 0–1 longitudinal septa. The specimen compares

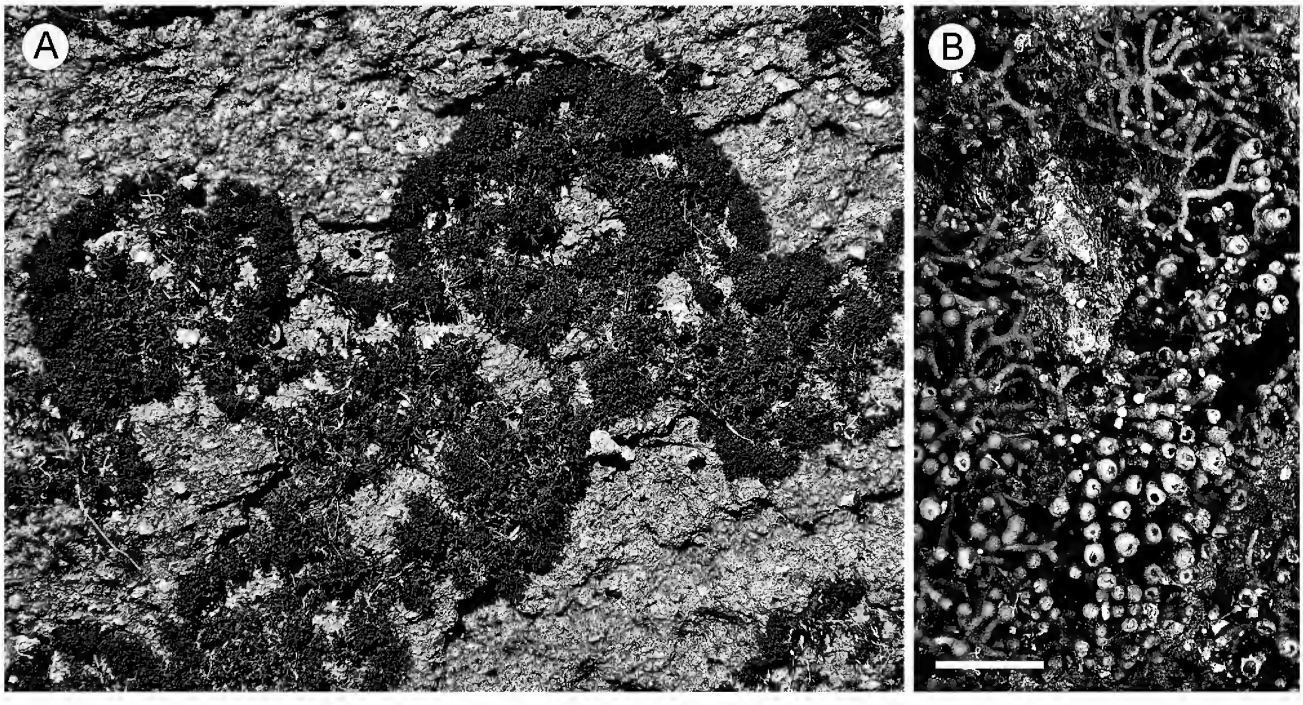

Fig. 51. *Lichina intermedia* habit (A) and detail of lobes and apothecia (B). Scales = 2 mm. Photos: J. Jarman.

favourably to the description of *L. biatorinum* provided by Jørgensen (2007) who also concurred with its determination (P.M. Jørgensen, pers. comm.).

Cape Gantheaume Conservation Park, c. 2 km S of entrance, 36°00'S 137°36'E, 1982, *K. Stove* 1490 (AD).

[5]*Leptogium crispatellum* Nyl.

On soil, leaf litter and the bases of trees and shrubs in moist, sheltered habitats. Characterised by the non-wrinkled, lead-grey to brown-grey lobes with numerous lobules and squamiform isidia, the red-brown, concave to plane apothecia to 1–2 mm wide, and the ellipsoid, submuriform ascospores, 16–26 × 8–10 µm, with 4–5 transverse and 0–1 longitudinal septa; some specimens have a patchy, sparse tomentum of silky white hairs on the underside.

Kelly Hill Conservation Park, 35°59'S 136°55'E, 1982, *K. Stove* 1683 (AD); Cape du Couedic Road, 35°56'S 136°45'E, 100 m alt., 2007, *R.W. Rogers* 11511 (BRI); northern end of Antechamber Bay, 35°47'S 138°04'E, 2010, *G. Kantvilas* 194/10 (AD, HO); near King George Beach, 35°39'S 137°07'E, 2 m alt., 2011, *G. Kantvilas* 330/11 (HO); Ravine des Casoars, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 456/12, 490/12 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 346/13 *& B. de Villiers* (AD, HO).

[5]*Leptogium pecten* F.Wilson

On moist rotting eucalypt logs in dry sclerophyll forest. This species has a dull grey, squamulose thallus with erect or ascending, finely divided, coralloid margins; the ascospores are 20–34 × 7–12 µm, with 0–1 longitudinal and 3 transverse septa. **Fig. 50B.**

Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 339/15 (AD, HO).

[a]*Leptogium schraderi* (Bernh.) Nyl.

On sandy soil in gaps in coastal *Melaleuca* woodland. This is the first Australian record of this inconspicuous species that is widespread in the Northern Hemisphere. It has the following salient characters: thallus forming tufts or sparse swards a few centimetres wide, comprised of ascending to erect lobes arising from an inconspicuous, squamulose primary thallus; lobes to 2.5 mm tall, unevenly 0.3–0.7 mm wide, rather glossy dark reddish brown, intensely wrinkled and furrowed, beset with scattered, black, glossy, subglobose isidia, 50–200 µm diam. The single, small specimen seen is sterile. Otálora *et al.* (2014) include this species in the reinstated genus *Scytinium*.

North Cape Road, 35°36'S 137°35'E, 5 m alt., 2013, *G. Kantvilas* 254/13 *& B. de Villiers* (HO).

Lichina intermedia (C.Bab.) M.Schultz

On intertidal rocks, forming black tufts or swards of rather knobbly, terete, olive-black, shrubby lobes to c. 10 mm tall and 0.3 mm thick. In the Australasian region, this widespread species was traditionally referred to under the cosmopolitan name *L. confinis* (O.F.Müll.) C.Agardh. Recent research by Schultz (2017) indicates that it is a distinct taxon. **Fig. 51.**

Northern end of Antechamber Bay, 35°46'S 138°04'E, 2013, *G. Kantvilas* 272/13 (AD, HO); Cape St Albans, 35°48'S 138°07'E, 2015, *G. Kantvilas* 389/15 (AD, HO).

Megalaria grossa (Pers. ex Nyl.) Hafellner

Epiphytic in damper microhabitats, especially on soft, thick bark, such as on the bases of eucalypts and on *Melaleuca*. Characterised by an effuse, smooth to rather warty thallus with black, lecideine apothecia, typically with a plane disc and persistent margin, and by the ellipsoid, 1-septate ascospores, 20–30 × 10–15 µm. In

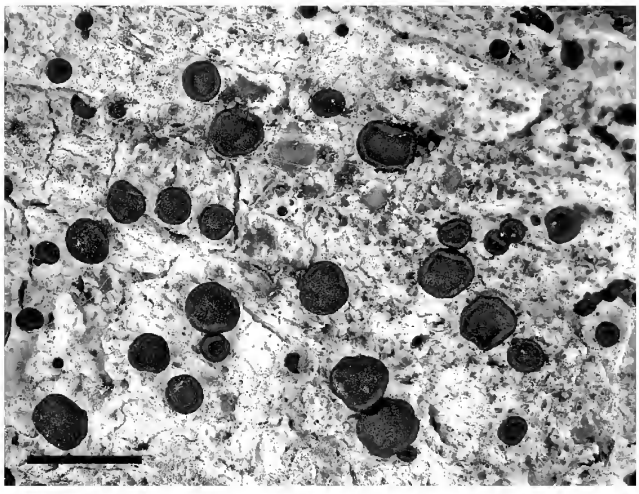

Fig. 52. *Megalaria grossa*. Scale = 2 mm. Photo: J. Jarman.

section, the epihymenium, hypothecium and inner and outer edges of the excipulum are pigmented intensely blue-black, N+ crimson (it is colourless within), features that distinguish this species from other, superficially similar members of the genus (Kantvilas 2016b). **Fig. 52.**

Dudley Peninsula, 35°50'S 138°05'E, 100 m alt., 1985, *J.A. Elix* 19704 *& L.H. Elix* (CANB); D'Estrees Bay, 35°56'S 137°36'E, 2 m alt., 1985, *J.A. Elix* 19711 *& L.H. Elix* (CANB); Ravine des Casoars, 35°48'S 136°37'E, 20 m alt., 1985, *J.A. Elix* 19733 *& L.H. Elix* (CANB); Ravine des Casoars, 35°48'S 136°37'E, 70 m alt., 1994, *H. Streimann* 54912 (AD, CANB); West Bay, 35°53'S 136°33'E, 10 m alt., 2011, *G. Kantvilas* 298/11 (AD, HO); Murray Lagoon, Timber Creek, 35°55'S 137°26'E, 15 m alt., 2011, *G. Kantvilas* 346/11 *& B. de Villiers* (HO); South West River, 36°01'S 136°52'E, 10 m alt., 2015, *G. Kantvilas* 421/15 (HO); Snake Lagoon carpark, 35°57'S 136°39'E, 70 m alt., 2015, *G. Kantvilas* 516/15 (HO).

[5]*Megalaria laureri* (Th.Fr.) Hafellner

On *Exocarpos* and *Allocasuarina* in woodland. Superficially similar to the preceding species but with a rather granular thallus and apothecia with a distinctive pink, N+ pale orange pigment in the excipulum and hypothecium. Unlike specimens from Tasmania (see Kantvilas 2008b), the Kangaroo Island specimens have ascospores 12–18 × 5–6 µm, and thus concur more closely to typical material from the Northern Hemisphere.

Red House Bay, 35°49'S 138°06'E, 10 m alt., 2010, *G. Kantvilas* 180/10 (AD, HO); Lades Road, 35°52'S 137°30'E, 30 m alt., 2011, *G. Kantvilas* 320/11 (HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 780/12 (HO); Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 364/13 (AD, HO); c. 1 km SSW of Kelly Hill Caves, 36°00'S 136°54'E, 40 m alt., 2015, *G. Kantvilas* 355/15 *& B. de Villiers* (AD, HO).

[5]*Megalaria subtasmanica* Kantvilas

Characterised by black apothecia with a colourless or at most dilutely blue-green, N+ crimson hypothecium and inner excipulum, an epihymenium with the same blue-green pigment, 2–6-spored asci, and ascospores mostly 30–44 × 12–20 µm (Kantvilas 2008b). Although usually found on twigs and trunks in mallee and *Callitris* woodland, one unusual specimen is from shaded rock but nevertheless displays all the salient features of this species.

Ravine des Casoars, 35°48'S 136°37'E, 20 m alt., 1985, *J.A. Elix* 19732 *& L.H. Elix* (CANB); adjacent to Eleanor River, 3 km E of Little Sahara sand dunes, 35°57'S 137°17'E, 1989, *D.N. Kraehenbuehl* 5183 (AD); c. 2 km W of South West River, 35°59'S 136°50'E, 50 m alt., 2007, *R.W. Rogers* 11488 *p.p.* (HO); c. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 120 m alt., 2011, *G. Kantvilas* 285/11, 290/11 *& B. de Villiers* (HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 431/12 *& B. de Villiers* (HO); Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 377/13 (HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 325/15 (AD, HO); South West River, 36°01'S 136°52'E, 10 m alt., 2015, *G. Kantvilas* 420/15 (AD, HO).

Menegazzia caesiopruinosa P.James

Widely scattered and locally common, especially on understorey trees such as *Exocarpos* and *Allocasuarina*, mostly in denser, taller or moister woodland. Recognised by the grey foliose thallus containing the stictic acid chemosyndrome, with round holes in the upper surface, and with soralia that form on helmet-shaped vesicles. **Fig. 53.**

Approx. 0.75 km SE of Amen Corner, 35°41'S 137°12'E, 1982, *K. Stove* 1780 *p.p.* (AD); Bunker Hill, 7 km NE of

Fig. 53. *Menegazzia caesiopruinosa*. Scale = 5 mm. Photo: B. de Villiers.

Cape de Couedic, 36°01'S 136°44'E, 100 m alt., 1994, *H. Streimann* 54991 (CANB); Kelly Hill Caves, 35°58'S 136°54'E, 1995, *P.C. Heyligers* L257 (CANB); c. 2 km W of South West River, 35°59'S 136°50'E, 50 m alt., 2007, *R.W. Rogers* 11507, 11508 (BRI, HO); Red House Bay, 35°49'S 138°06'E, 10 m alt., 2010, *G. Kantvilas* 177/10 (AD, HO); Cape Borda lighthouse cemetery, 35°45'S 136°38'E, 90 m alt., 2010, *G. Kantvilas* 191/10 (HO); c. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 100 m alt., 2010, *G. Kantvilas* 200/10 (AD, HO); Lades Road, 35°52'S 137°30'E, 30 m alt., 2011, *G. Kantvilas* 318/11 (AD, HO); Murray Lagoon, Timber Creek, 35°55'S 137°26'E, 15 m alt., 2011, *G. Kantvilas* 340/11 *& B. de Villiers* (HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 428/12 *& B. de Villiers* (HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 588/12 *& B. de Villiers* (HO); Hanson Bay Track, c. 1 km S of Grassdale Homestead, 36°00'S 136°52'E, 5 m alt., 2015, *G. Kantvilas* 363/15 *& B. de Villiers* (AD, HO); South West River, 36°01'S 136°52'E, 10 m alt., 2015, *G. Kantvilas* 419/15 (HO).

[a]*Metamelanea melambola* (Tuck.) Henssen

On seasonally submerged rocks in a fast-flowing freshwater stream in dry sclerophyll forest, growing together with *Ephebe ocellata*. This species is a member of a potentially rich but as yet under-collected assemblage of cyanophilic lichens that occurs in aquatic or semi-aquatic habitats. It is recognised as follows: thallus blackish, crustose, areolate, containing a single-celled cyanobacterial photobiont with a brownish gelatinous sheath; apothecia roundish, c. 0.5 mm wide, ± immersed in the surface of the thallus, with an open, dark brown disc in which the hymenium is divided by bands of sterile tissue; asci thin-walled, lacking any apical amyloid structures, 8-spored; ascospores simple, hyaline, ellipsoid, 9.5–12 × 6–7 µm (see also Henssen 1989; Schultz 2008).

Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 545/15 (HO).

[s]*Micarea denigrata* (Fr.) Hedl.

A species of dead, bleached eucalypt wood, characterised by a grey-green areolate thallus that contains gyrophoric acid, apothecia with a grey, C+ violet, K+ violet epihymenium and abundant paraphyses, and 0–1-septate ascospores that are 10–12 × 3–4 µm and sometimes a little curved (Czarnota 2007; Coppins 2009).

Antechamber Bay, near The Kona, 35°49'S 138°05'E, 20 m alt., 2010, *G. Kantvilas* 207/10 (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 584/12 *& B. de Villiers* (AD, HO).

[a]*Micarea globulosella* (Nyl.) Coppins

On fragments of eucalypt wood in a sheep paddock. Characterised as follows: thallus subsquamulose-areolate, dull olive-grey, C+ red in section; photobiont cells 5–10 µm; apothecia black, subglobose, to 0.3 mm wide, C+ red in section, with the epihymenium K+, C+ violet; ascospores fusiform, 1–3 (–7)-septate, 15–28 × 2.5–3 µm; macroconidia curved, 18–23 × 1–1.5 µm (for additional descriptive data, see Czarnota 2007 and Coppins 2009). The thallus of the Kangaroo Island specimen is rather better developed than is usual in this species.

Creek Bay Farm, 35°50'S 138°05'E, 65 m alt., 2013, *G. Kantvilas* 363/13 (AD, HO).

[T]*Micarea kartana* Kantvilas & Coppins

On a rotting, charred eucalypt log in dry sclerophyll forest. This species is a member of the *M. prasina* complex and is characterised by a goniocyst-like thallus that contains gyrophoric acid (C+ red) and *sedifolia*-grey pigment (C+ violet), grey to blackish apothecia steeped in a unique olivaceous pigment that reacts K–, N–, C+ yellowish brown, and 0–1-septate ascospores, 10–14 × 4–5.5 µm (Kantvilas 2018d). It is known only from the type locality. **Fig. 54A.**

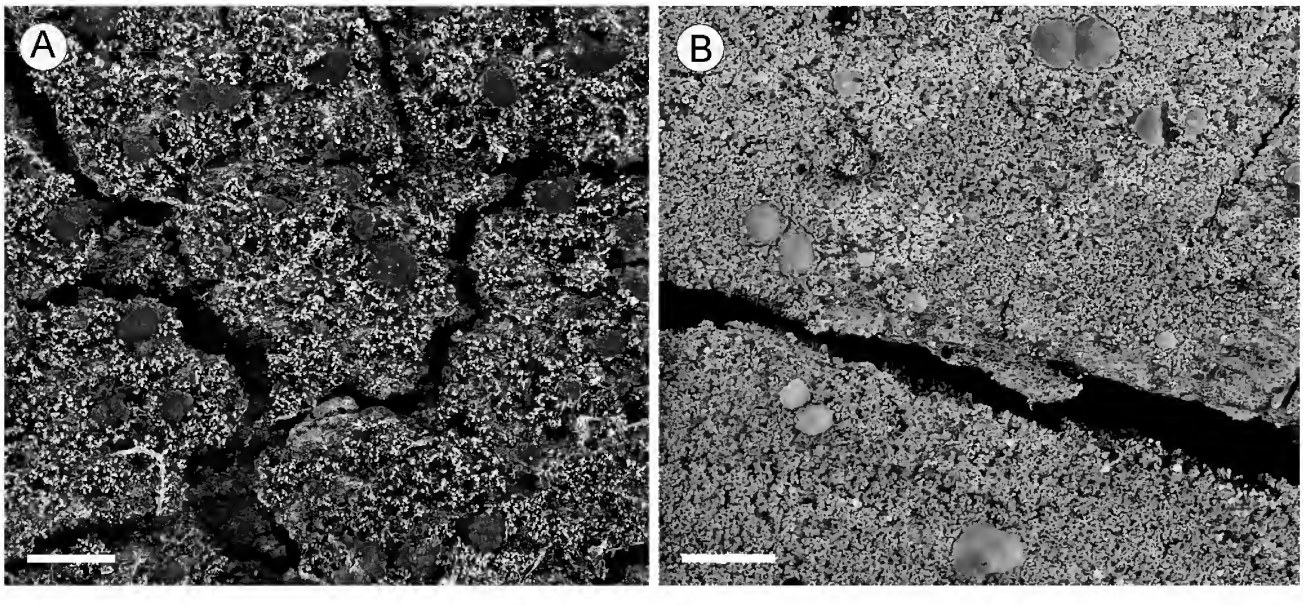

Fig. 54. A *Micarea kartana*. **B** *Micarea micrococca*. Scales = 1 mm. Photos: J. Jarman.

Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 338/15 [type], 337/15 (AD, E, HO).

[5]*Micarea melaneida* (Nyl.) Coppins

On consolidated soil in mallee woodland, growing amongst the squamules of *Psora decipiens*. Characterised by a rather scurfy, granular, inconspicuous thallus with photobiont cells 4–7 µm diam., black, convex apothecia, internally pigmented red-brown, K± intensifying, N+ orange-red, most intensely so in the hypothecium and epihymenium but only dilutely in the hymenium, and broadly ellipsoid, 1-septate ascospores, 9–12 × 5–6 µm; no pycnidia were observed.

Lashmar Conservation Park, c. 2 km S of Cape Coutts, 35°47'S 138°04'E, 50 m alt., 2015, *G. Kantvilas* 429/15 *& B. de Villiers* (HO).

[5]*Micarea micrococca* (Körb.) Gams ex Coppins aggr.

Collected from the very dry bark of an old, fissured *Callitris* trunk in a small remnant stand of coniferous coastal woodland. This is a remarkable record for Kangaroo Island of a widespread 'old forest' species. It is characterised by a granular-leprose, green thallus containing methoxymicareic acid (C–), and typically internally unpigmented, immarginate apothecia with 0–1-septate ascospores, which, in the Kangaroo Island specimen, are 7–9 × 3–3.5 µm. Further descriptive data for this complex and variable taxon are given by Coppins (2009), Kantvilas (2018d) and Launis *et al.* (2019). **Fig. 54B.**

Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 437/12 *& B. de Villiers* (AD, HO).

[5]*Monerolechia badia* (Fr.) Kalb

On rocks in coastal and open woodland habitats. Although commonly keyed out as being parasitic on other lichens (e.g. Elix *et al.* 2017), in my experience, this species occurs mostly independently and is characterised by a brown or brownish grey, squamulose thallus lacking lichen substances, black apothecia with a carbonised excipulum, *Lecanora*-type asci and relatively small, *Buellia*-type ascospores, 9–15 × 5–8 µm, and bacilliform conidia, 3–5 × 0.5–1.5 µm (Elix 2015).

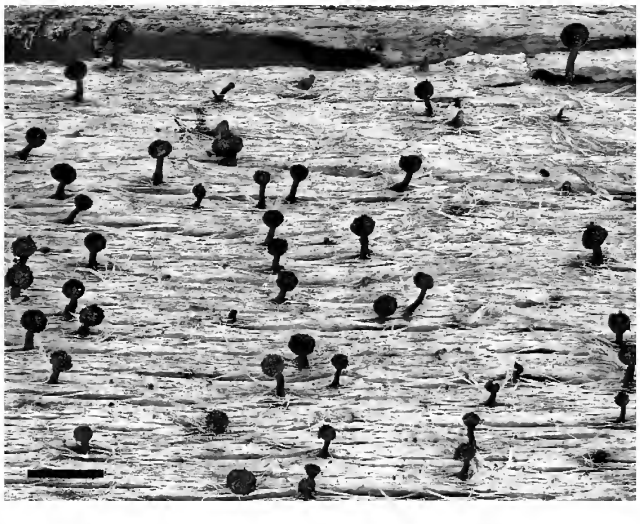

Fig. 55. *Mycocalicium victoriae*. Scale = 1 mm. Photo: J. Jarman.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 761/12 *& B. de Villiers* (HO); northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2013, *G. Kantvilas* 267/13 (HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 544/15 (HO).

[5]*Mycocalicium victoriae* (C.Knight ex F.Wilson) Nádv.

On bleached eucalypt wood. This species is non-lichenised but it is frequently included in lichen checklists on account of its close ecological relationship and morphological similarity to lichenised calicioid genera such as *Calicium* and *Chaenotheca*. It is characterised by shiny, dark reddish black, stalked mazaedia to c. 1 mm tall, with a cellular excipulum and brown, simple, ellipsoid ascospores, 6–8 × 3–3.5 µm. This species is separated from the very similar *M. albonigrum* (Nyl.) Tibell by having the central part of the stalk composed of interwoven, hyaline (rather than dark brownish or greenish) hyphae (Tibell 1987). **Fig. 55.**

West Bay, 15 km SSW of Cape Borda, 35°53'S 136°33'E, 40 m alt., 1994, *H.T. Lumbsch* 10918, *A. Dickhäuser & H. Streimann* (CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55128 (AD, CANB); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 345/15 (AD, HO, UPS); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 30 m alt., 2015, *G. Kantvilas* 485/15 (AD, HO).

[5]*Notocladonia cochleata* (Müll.Arg) S.Hammer

On consolidated soil in mallee woodland. The single specimen seen is extremely juvenile and comprised of basal squamules with incipient podetia, but its identity was confirmed by the presence of usnic and divaricatic acids. Until the work of Hammer (2003), this characteristically Australasian lichen was included in the Neotropical genus *Ramalea* Nyl.

Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2013, *G. Kantvilas* 228/13A *& B. de Villiers* (HO).

Notoparmelia erumpens (Kurok.) A.Crespo, Ferencova & Divakar

On rocks in dry sclerophyll forest. This grey, foliose species is easily recognised by its laminal, coarse, granular soredia that develop along conspicuous, reticulate, white pseudocyphellae, and by the presence of salazinic acid (medulla K+ yellow→red). It is unusual that this is the only species of this large genus to have been recorded from the island. Until recently, it was included in the genus *Parmelia* (Ferencova *et al.* 2014). **Fig. 56.**

Mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55091 (CANB); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 2 m alt., 2013, *G. Kantvilas* 328/13 *& B. de Villiers* (HO).

Ochrolechia africana Vain.

On *Melaleuca* trunks in swampy woodland and saltmarsh. The specimens from Kangaroo Island of this non-sorediate, fertile species contain gyrophoric acid only.

Western Cove Road, 35°44'S 137°35'E, 2 m alt., 2011, *G. Kantvilas* 306/11 (AD, HO); Chapman River, 35°48'S

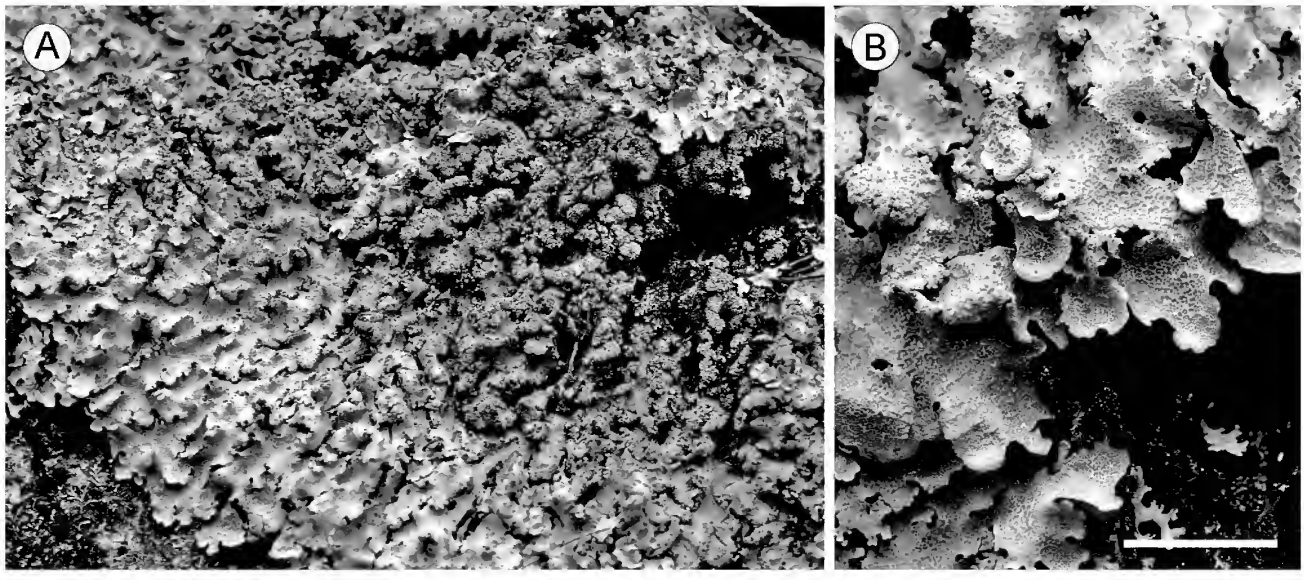

Fig. 56. *Notoparmelia erumpens*. **A** Habit. **B** Detail, showing the coarse, laminal, granular soredia. Scale = 10 mm. Photos: J. Jarman.

138°04'E, 2 m alt., 2011, *G. Kantvilas* 369/11 *& B. de Villiers* (AD, HO).

[5]*Ochrolechia gyrophorica* (A.W.Archer) A.W.Archer & Lumbsch

On the bark and wood of older trees, especially on the basal, rough-barked stockings of eucalypts. This species is characterised by a white, sorediate thallus containing gyrophoric acid, sometimes with additional traces of 5–*O*–methylhiascic acid, by the 6 (–8)-spored asci and the large ascospores, 30–60 × 20–30 µm. Most of the specimens seen are sterile.

Ravine des Casoars, 35°48'S 136°37'E, 20 m alt., 1985, *J.A Elix* 19735 *& L.H. Elix* (CANB); Waterfall Creek, 30 km ENE of Cape Borda, 35°42'S 136°54'E, 140 m alt., 1994, *H.T. Lumbsch* 10908b, *A. Dickhäuser & H. Streimann* (CANB); West Bay, 15 km SSW of Cape Borda, 35°53'S 136°33'E, 40 m alt., 1994, *H.T. Lumbsch* 10917, *A. Dickhäuser & H. Streimann* (CANB); 1 km S of Rocky River Settlement, 35°57'S 136°44'E, 70 m alt., 1994, *H. Streimann* 55010A (CANB); Creek Bay Farm, headwaters of Lubra Creek, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 375/11, 376/11 (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 587/12, 774/12, 776/12 *& B. de Villiers* (AD, HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 319/15, 348/15 *& B. de Villiers* (AD, HO); c. 1 km SSW of Kelly Hill Caves, 36°00'S 136°54'E, 40 m alt., 2015, *G. Kantvilas* 356/15 *& B. de Villiers* (AD, HO); South West River, 36°01'S 136°52'E, 10 m alt., 2015, *G. Kantvilas* 424/15 (HO).

[T]*Ochrolechia insularis* Kantvilas & Elix

Known only from Kangaroo Island, where it is very localised on large granite boulders along the cliff edge at Cape Willoughby (see Lumbsch *et al.* 2011). I have

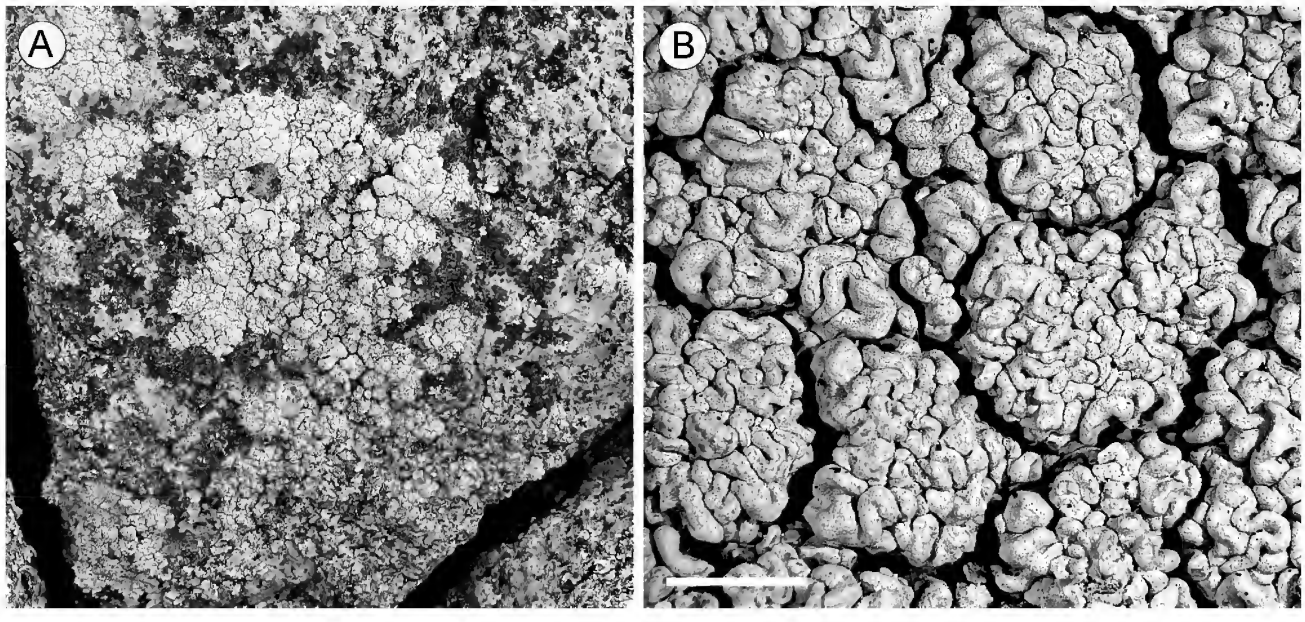

Fig. 57. *Ochrolechia insularis*. **A** General habit, growing on a coastal granite boulder. **B** Detail of the nodulose, plicate thallus. Scale = 2 mm. Photo (B): J. Jarman.

searched for it elsewhere on the island without success. This species is not known to have apothecia and has a nodulose, papillose or plicate thallus containing gyrophoric acid (C+ red). It is rather similar to *O. apiculata* Verseghy, which is very common and widespread on coastal rocks in south-eastern Australia and Tasmania, but which, curiously, has not been recorded from Kangaroo Island. That species differs chiefly by being abundantly fertile and having a rimose-areolate to verruculose thallus (see McCarthy *et al.* 2017). **Fig. 57.**

Cape Willoughby, 35°50'S 138°08'E, 50 m alt., 2008, *G. Kantvilas* 332/08 (AD, HO); same locality, 2009, *G. Kantvilas* 367/09 (AD, CANB, HO) [type].

[s]*Opegrapha atra* Pers.

Found mostly on smooth-barked twigs and trunks in mallee, dry sclerophyll forest and *Callitris* woodland. The general habit, the K+ olive-green excipulum, and the 3-septate ascospores, 12–19 × 3–5 µm, all accord with the cosmopolitan species *O. atra* (see Pentecost & James 2009), but the conidia are variable, suggesting that more than one taxon is represented: in specimens from eucalypts, they are distinctly curved, 5–8 × 1–1.5 µm; in one specimen from coastal *Myoporum*, they are straight and 6–8 × 2 µm; whereas in a specimen from *Callitris* they are bacilliform and 4–6 × 0.7–1 µm. Phylogenetic research (Ertz *et al.* 2009) indicates that *Opegrapha* in the traditional sense is polyphyletic, necessitating the transfer of some species to other genera, notably of *O. atra* to *Arthonia*. However, pending a review of all Australian taxa, I have elected to retain the genus *Opegrapha* in its broader sense. **Fig. 58A.**

Approx. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 100 m alt., 2010, *G. Kantvilas* 204/10 (AD, BR, HO); Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2010, *G. Kantvilas* 218/10 (AD, BR, HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 10 m alt., 2012, *G. Kantvilas* 508/12 (AD, HO); Strawbridge Point, 35°47'S 137°47'E, 5 m alt., 2012, *G. Kantvilas* 545/12 *& B. de Villiers* (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 782/12 (HO); Red House Bay, 35°49'S 138°06'E, 15 m alt., 2013, *G. Kantvilas* 320/13 (HO); near Kingscote Airport along Aranmore Road, 35°43'S 137°33'E, 5 m alt., 2015, *G. Kantvilas* 499/15 *& B. de Villiers* (HO).

[a]*Opegrapha dolomitica* (Arnold) Clauzade & Cl.Roux

In sheltered, moist underhangs on coastal limestone. Characterised by the black, contorted, sulcate lirellae, the K– excipulum, the hyaline, 3-septate ascospores, 16–22 × 4–6 µm, and the bacilliform conidia, 4–6 × 0.8 µm. The ascospores are somewhat shorter than cited in European floras (Pentecost & James 2009). **Fig. 58B.**

West Bay, 35°53'S 136°33'E, 3 m alt., 2011, *G. Kantvilas* 293/11 (AD, BR, HO); Ravine des Casoars, 35°48'S 136°35'E, 2 m alt., 2012, *G. Kantvilas* 452/12 *& B. de Villiers* (AD, HO); Point Ellen, 36°00'S 137°11'E, 5 m alt., 2013, *G. Kantvilas* 216/13 (AD, HO).

[a]*Opegrapha niveoatra* (Borrer) Laundon

On wood and bark in woodland. Characterised by the mostly simple, straight or curved lirellae, 0.4–1 mm long, with a black excipulum, K+ olive in section, and the (3–) 7-septate ascospores, 22–40 × 3.5–4 µm; black, speck-like pycnidia are usually abundant, and two types of conidia have been observed: curved, 7–9 × 1–1.5 µm; and ellipsoid, 4–5 × 1.5–2 µm.

Approx. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 120 m alt., 2011, *G. Kantvilas* 284/11 *& B. de Villiers* (BR, HO); Chapman River, 35°48'S 138°04'E, 10 m alt., 2012, *G. Kantvilas* 399/12 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 30 m alt., 2015, *G. Kantvilas* 486/15 (HO).

[a]*Opegrapha rupestris* Pers.

Occurring as a parasite on *Verrucaria muralis* on limestone; the tiny, black lirellae occur in clusters amongst the black perithecia of the *Verrucaria*. Although somewhat similar to *O. calcarea* Turn. ex Sm., *O. rupestris* differs by lacking a *Trentepohlia* photobiont,

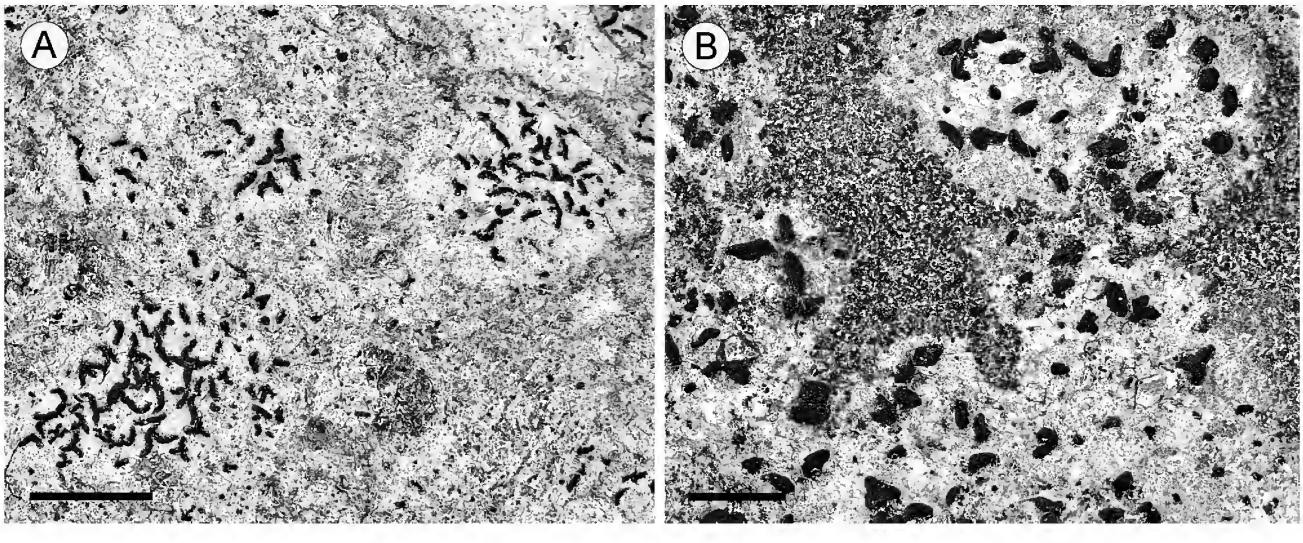

Fig. 58. A *Opegrapha atra*. **B** *Opegrapha dolomitica*. Scales = 2 mm. Photos: J. Jarman.

and by having an exciple that is K± brownish black, and 3-septate ascospores, 17–21 × 6–8 µm, that become brownish grey when older.

Flour Cask Bay, 2013, *A. Wells s.n.* (HO).

[a]*Opegrapha spodopolia* Nyl.

In shaded underhangs on non-calcareous, coastal rocks. Hitherto recorded only from New Zealand (Galloway 2007), this species is characterised by a scurfy thallus lacking lichen substances, simple, stellate to contorted lirellae, 0.5–0.8 mm long, with an open base and a K+ olive excipulum, a hymenium inspersed with oil droplets, fusiform, 4–6-septate ascospores, 20–30 × 5–7 µm, with the cells ± equal, and rod-shaped conidia, 5–7 × 0.5–1 µm. The Kangaroo Island specimens have been compared with Nylander's type specimen (in H).

Mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55068 (AD, CANB); Rocky River, 35°58'S 136°39'E, 10 m alt., 2015, *G. Kantvilas* 512/15, 515/15 *& B. de Villiers* (AD, HO).

[s]*Opegrapha varia* Ach. *sens. lat.*

On wood and bark in coastal *Melaleuca* woodland. Characterised by the simple or forked, often rather short and ellipsoid lirellae in which the black disc is frequently exposed, the K± brown excipulum, the fusiform 4–6-septate ascospores, 18–38 × 6–8 µm, in which the central cell is noticeably enlarged, and the bacilliform to fusiform conidia, 4–5 × 0.5–1.5 µm.

Chapman River estuary, 35°50'S 138°05'E, 3 m alt., 1985, *J.A. Elix* 19690 *& L.H. Elix* (CANB); West Bay, 15 km SSW of Cape Borda, 35°53'S 136°33'E, 40 m alt., 1994, *H.T. Lumbsch* 10920d, 10920f, *A. Dickhäuser & H. Streimann* (CANB); Pelican Lagoon, 35°49'S 137°48'E, 10 m alt., 2012, *G. Kantvilas* 411/12 *& B. de Villiers* (AD, HO); Ravine des Casoars, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 489/12 *& B. de Villiers* (AD, HO); Hanson Bay Track, c. 1 km SW of Grassdale Lagoon, 36°00'S 136°52'E, 50 m alt., 2015, *G. Kantvilas* 300/15 *& B. de Villiers* (HO).

Pannaria obscura Müll.Arg.

Locally abundant on bark, especially in older woodlands such as those dominated by *Melaleuca* or *Callitris*, or in moister microhabitats on older mallee eucalypts. This attractive, small, grey, foliose species is one of relatively few cyanolichens recorded for the island. Its presence is often an indicator of a habitat that potentially supports other unusual or uncommon lichens. **Fig. 59.**

Bunker Hill, 36°01'S 136°44'E, 1982, *K. Stove* 1603 (AD); Rocky River, 4 km W of Rocky River Homestead, 35°57'S 136°42'E, 50 m alt., 1985, *J.A. Elix* 19621 *& L.H. Elix* (CANB); D'Estrees Bay, 35°56'S 137°36'E, 2 m alt., 1985, *J.A. Elix* 19712 *& L.H. Elix* (CANB); West Bay, 35°53'S 136°33'E, 40 m alt., 1994, *H.T. Lumbsch* 10920a, *A. Dickhäuser & H. Streimann* (CANB); same locality, 1994, *H. Streimann* 55022 (CANB); same locality, 2011, *G. Kantvilas* 294/11 (AD, HO); 7 km NE of Cape Couedic, 36°01'S 136°44'E, 100 m alt., 1994, *H. Streimann* 54992 (AD, CANB); 24 km SSE of Cape Borda, 35°57'S 136°39'E, 40 m alt., 1994, *H. Streimann* 55048 (AD, CANB); Cape du Couedic Road, 35°56'S 136°45'E, 100 m alt., 2007, *R.W. Rogers* 11494, 11496 (BRI); c. 2 km W of South West River, 35°59'30"S 136°50'30"E, 50 m alt., 50 m alt., 2007, *R.W. Rogers* 11495 (BRI); Moffatt Road, 35°49'S 138°00'E, 70 m alt., 2011, *G. Kantvilas* 252/11 *& B. de Villiers* (HO); Lashmar Lagoon, 35°49'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 277/11 *& B. de Villiers* (HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 419/12 *& B. de Villiers* (AD, HO); Red House Bay, 35°49'S 138°06'E, 15 m alt., 2013, *G. Kantvilas* 314/13 (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 341/13 *& B. de Villiers* (AD, HO); South West River, 36°01'S 136°52'E, 10 m alt., 2015, *G. Kantvilas* 418/15 (AD, HO).

Fig. 59. *Pannaria obscura*, one of relatively few cyanophilic lichens present on the island. Scale = 10 mm.

Paraporpidia glauca (Taylor) Rambold

On consolidated soil in gaps in mallee woodland, where it forms a thick, glaucous grey crust, associated with species of *Psora* and *Diploschistes*. All Kangaroo Island specimens seen are sterile and their identification is based on thallus morphology, habitat ecology and chemical composition (2'-*O*-methylperlatolic or confluentic acids).

Willson River Road, 35°50'S 138°01'E, 30 m alt., 2011, *G. Kantvilas* 248/11 (HO); Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2013, *G. Kantvilas* 228/13 *& B. de Villiers* (AD, HO); Lashmar Conservation Park, c. 2 km S of Cape Coutts, 35°47'S 138°04'E, 50 m alt., 2015, *G. Kantvilas* 434/15 *& B. de Villiers* (HO); near Kingscote Airport along Aranmore Road, 35°42'S 137°32'E, 5 m alt., 2015, *G. Kantvilas* 501/15 *& B. de Villiers* (HO).

Paraporpidia leptocarpa (C.Bab. & Mitt.) Rambold & Hertel

Locally abundant on exposed non-calcareous rocks, mainly in more inland areas in dry sclerophyll forest. Although seemingly very well-developed, with a thick, glaucous grey crustose thallus containing 2'-*O*-methylperlatolic or confluentic acids, and with abundant, plane, black apothecia, none of the many specimens studied has mature ascospores or asci. **Fig. 60.**

S of Wisanger Hills Homestead, 7 km WSW of Emu Bay, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19639, 19642 *& L.H. Elix* (CANB); Ballast Head, American River, 35°45'S 137°48'E, 1986, *D.N. Kraehenbuehl s.n.* (MEL); along banks of Middle River, 35°44'S 137°04'E, 1989, *D.N. Kraehenbuehl* 5161 (AD); near Bark Hut Road, 33 km WSW of Kingscote, 35°43'S 137°16'E, 160 m alt., 1994, *H. Streimann* 54880, 54954 (CANB); Cygnet River, Stokes Bay Road, 41 km WSW of Kingscote, 35°44'S 137°13'E, 110 m alt., 1994, *H. Streimann* 54887, 54890, 54891, 54892, 54893, 54894, 54955 (AD, CANB); Ravine des Casoars, 35°48'S 136°37'E, 70 alt., 1994, *H. Streimann* 54959 (CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55071, 55105 (CANB); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 552/12 *& B. de Villiers* (AD, HO); Cannery Walking Track, American River, 2013, *A. Wells s.n.* (HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 5 m alt., 2013, *G. Kantvilas* 3326/13 *& B. de Villiers* (HO).

[5]*Parmotrema cetratum* (Ach.) Hale

On rocks in dry sclerophyll forest. Characterised by broadly rounded, non-sorediate, grey lobes to 15 mm wide, with a reticulately maculate upper surface, black underside and conspicuous, marginal cilia; it contains salazinic acid (medulla K+ yellow→red). **Fig. 61A.**

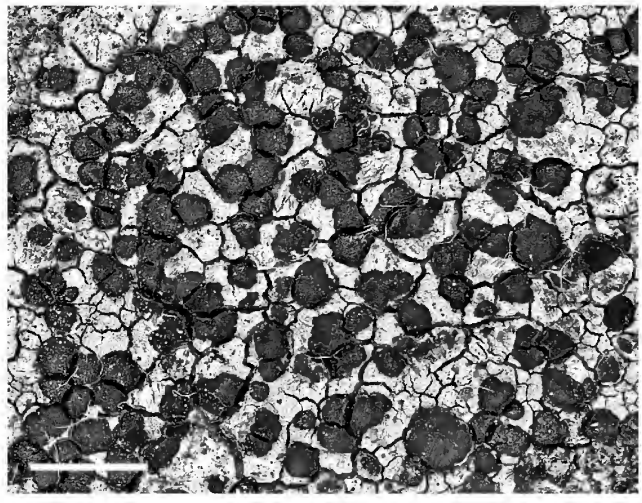

Fig. 60. *Paraporpidia leptocarpa*. Scale = 2 mm. Photo: J. Jarman.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 550/12 *& B. de Villiers* (AD, HO).

[5]*Parmotrema cooperi* (J.Steiner & Zahlbr.) Sérus.

A conspicuous and highly attractive, large, grey, foliose lichen with a C+ red medulla, found on bark or rocks in moist woodland habitats.

American River, 35°46'S 137°47'E, 2007, *R.W. Rogers* 11500 (BRI); Lashmar Lagoon, 35°49'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 262/11, 274/11 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 329/13 *& B. de Villiers* (HO).

Parmotrema neopustulatum Kurok.

On rocks in dry sclerophyll forest; more rarely on bark. This species is similar to *P. reticulatum* (below) but differs in having a rather wrinkled and flaking upper surface and coarse soredia that often become ± corticate.

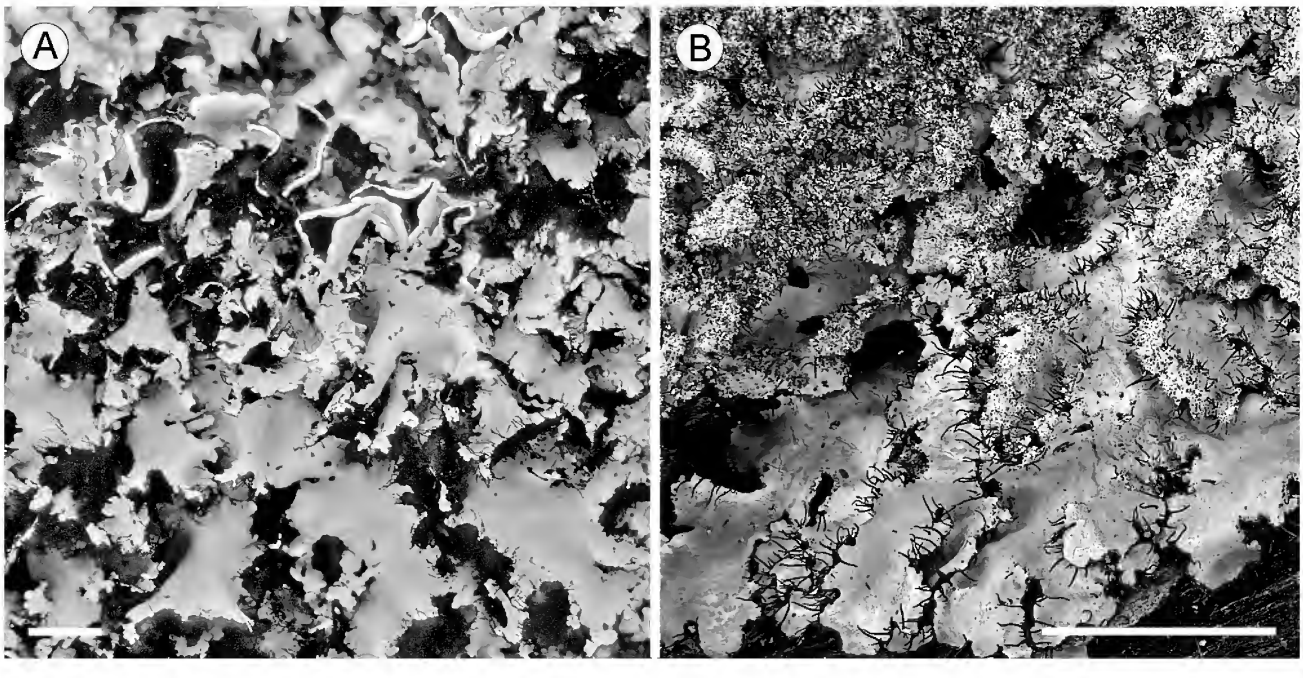

Fig. 61. A *Parmotrema cetratum*. **B** *Parmotrema ochrocrinitum*. Scales = 5 mm. Photos: J. Jarman.

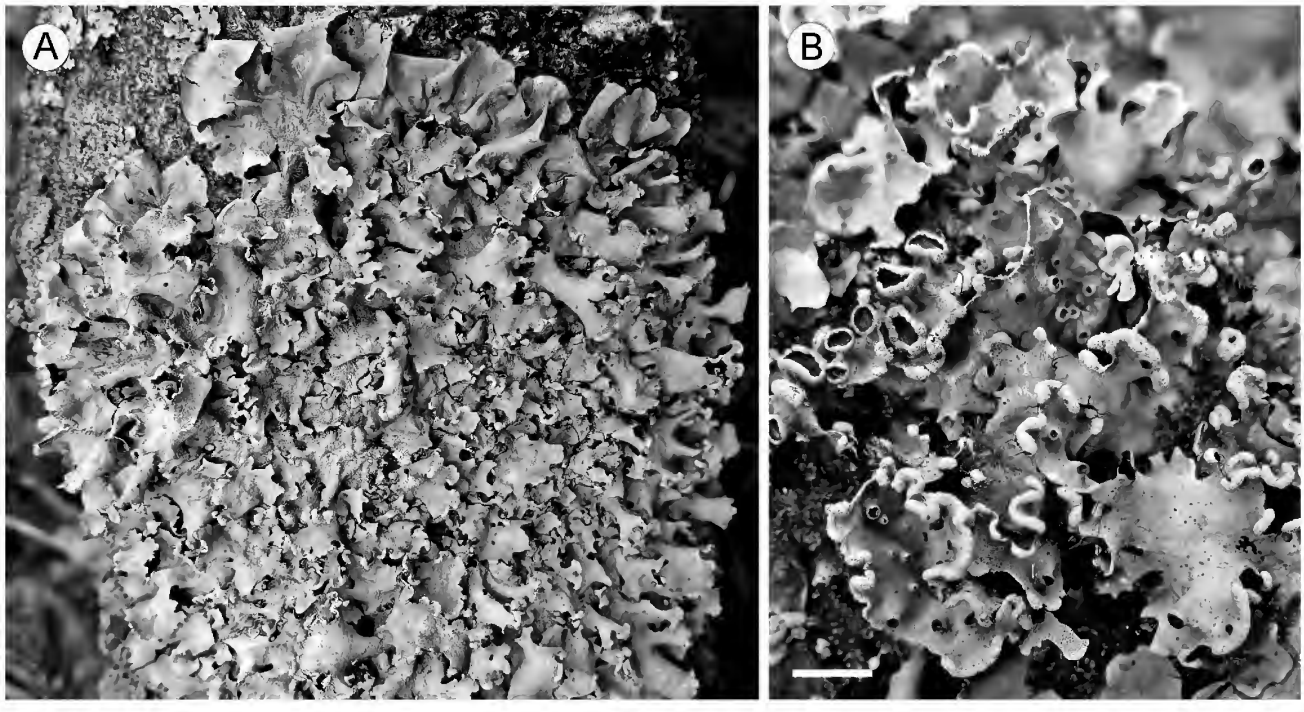

Fig. 62. *Parmotrema perlatum*. **A** habit. **B** detail of sorediate lobes and apothecia. Scale = 5 mm.

Chapman River estuary, 35°50'S 138°05'E, 3 m alt., 1985, *J.A. Elix* 19697 *& L.H. Elix* (CANB); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvila*s 549/12 *& B. de Villiers* (AD, HO); northern end of Antechamber Bay, 35°46'S 138°04'E, 5 m alt., 2013, *G. Kantvilas* 263/13 (HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 314/15 (AD, HO).

[5]*Parmotrema ochrocrinitum* Elix & J.Johnst.

Occasional on trees, especially in *Callitris* woodland and swampy *Melaleuca* woodland. This attractive, grey, foliose lichen has very distinctive ciliate isidia and contains an orange, K+ purple pigment (in addition to stictic acid and associated substances) that is visible in areas where the black undersurface has been torn or abraded. **Fig. 61B.**

Lashmar Lagoon, 35°48'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 260/11 *& B. de Villiers* (HO); Western Cove Road, 35°44'S 137°35'E, 2 m alt., 2011, *G. Kantvilas* 304/11 (AD, HO); Pelican Lagoon, 35°49'S 137°48'E, 10 m alt., 2012, *G. Kantvilas* 408/12 *& B. de Villiers* (HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 420/12 *& B. de Villiers* (AD, HO); Red House Bay, 35°49'S 138°06'E, 15 m alt., 2013, *G. Kantvilas* 313/13, 317/13, 318/13 (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 343/13 *& B. de Villiers* (AD, HO); Pelican Lagoon Conservation Park, along Mitchell Drive, 35°48'S 137°48'E, 10 m alt., 2015, *G. Kantvilas* 309/15 (HO).

Parmotrema perlatum (Huds.) M.Choisy

On trees, shrubs and rocks in woodland. This common, large, grey, foliose lichen is easily recognised by its broadly rounded lobes (to 8 mm wide) with conspicuous marginal cilia, linear to oval marginal soralia on the tips of upturned lobes, and the presence of stictic acid (medulla K+ yellow). **Fig. 62.**

Near American River, 35°47'S 137°46'E, 1962, *M. McKay s.n.* (AD); E of Penneshaw on Willoughby Road, 35°45'S 137°58'E, 2007, *R.W. Rogers* 11499 (BRI); American River, 35°46'S 137°47'E, 2007, *R.W. Rogers* 11501 (BRI); c. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 120 m alt., 2011, *G. Kantvilas* 287/11 *& B. de Villiers* (AD, HO); Western Cove Road, 35°44'S 137°35'E, 2 m alt., 2011, *G. Kantvilas* 303/11 (HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 421/12 *& B. de Villiers* (AD, HO); Creek Bay Farm, near The Kona, 35°49'S 138°06'E, 70 m alt., 2015, *G. Kantvilas* 504/15 (AD, HO).

Parmotrema reticulatum (Taylor) M.Choisy

A widespread and rather common grey foliose species on trees and rocks, recognised by broadly rounded, loosely attached lobes with a network of fine cracks on the upper surface, usually prominently ciliate margins, and linear, marginal soralia. It is most easily confused with *P. perlatum*, from which it differs by containing salazinic acid (medulla K+ yellow→red). **Fig. 63.**

Chapman River estuary, 35°50'S 138°05'E, 3 m alt., 1985, *J.A. Elix* 19691, 19696 *& L.H. Elix* (CANB); Waterfall Creek, 30 km ENE of Cape Borda, 35°42'S 136°54'E, 140 m alt., 1994, *H. Streimann* 54939 (CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55061, 55063, 55065 (AD, CANB); Billygoat Gully, Western River Conservation Park, 35°41'S 136°54'E, 1995, *P.C. Heyligers* L258 (CANB); E of Penneshaw, 35°43'S 137°57'E, 1997, *R.J. Bates* 48403 (AD); American River, 35°46'S 137°47'E, 2007, *R.W. Rogers* 11497 (BRI); Lashmar Lagoon, 35°48'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 259/11 *& B. de Villiers* (AD, HO); Strawbridge Point, 35°47'S 137°47'E, 5 m alt., 2012, *G. Kantvilas* 539/12 *& B. de Villiers* (HO).

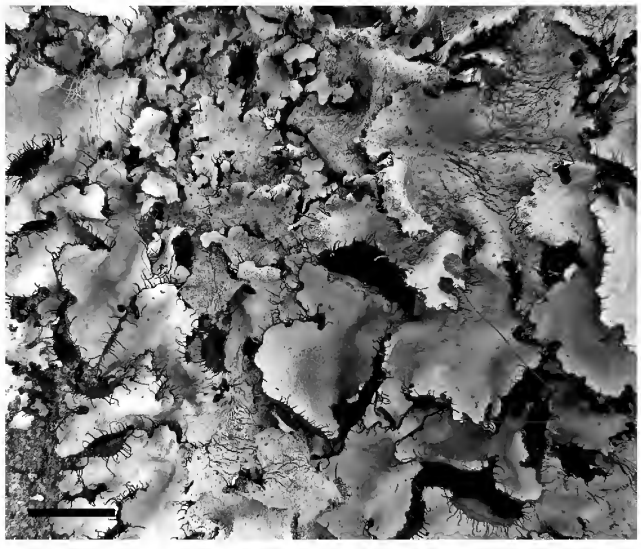

Fig. 63. *Parmotrema reticulatum*. Scale = 5 mm.

[5]*Pertusaria albissima* Müll.Arg.

On *Melaleuca* in mallee woodland. This rare species is characterised by a whitish crustose thallus, rather flattened, verruciform apothecia, 8-spored asci and large ascospores, 50–74 × 20–30 µm. The absence of lichen substances best distinguishes it from the common *P. pertractata*.

Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 317/15 *& B. de Villiers* (HO).

Pertusaria crassilabra Müll.Arg.

= [T]*Pertusaria melanospora* var. *sorediata* Elix & A.W.Archer

On coastal rocks. Characterised by a dull yellowish, C+ orange thallus with sparse, coarse soredia, verruciform apothecia with conspicuous, usually gaping, black ostioles, and brownish to blue-grey ascospores, 40–76 × 24–42 µm (Kantvilas 2018b). One collection (*Streimann* 55087) is infected with the lichenicolous fungus *Skyttea mayrhoferi* Diederich & Etayo. **Fig. 64.**

Hog Bay, Penneshaw, 35°43'S 137°56'E, 2 m alt., 1985, *J.A. Elix* 19682 *& L.H. Elix* (CANB); same locality, 15 m alt., 1994, *H. Streimann* 54865, 54868 (AD, CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55087 (CANB); Cape St Albans, 35°48'S 138°07'E, 20 m alt., 2010, *G. Kantvilas* 176/10 (AD, HO) [type of *P. melanospora* var. *sorediata*]; Windmill Bay, 35°51'S 138°07'E, 20 m alt., *G. Kantvilas* 469/12 (AD, HO); c. 3.5 km NE of Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 536/12 *& B. de Villiers* (AD, HO); Western River Cove, W end of beach, 35°40'S 136°58'E, 2 m alt., 2015, *G. Kantvilas* 413/15 *& B. de Villiers* (HO).

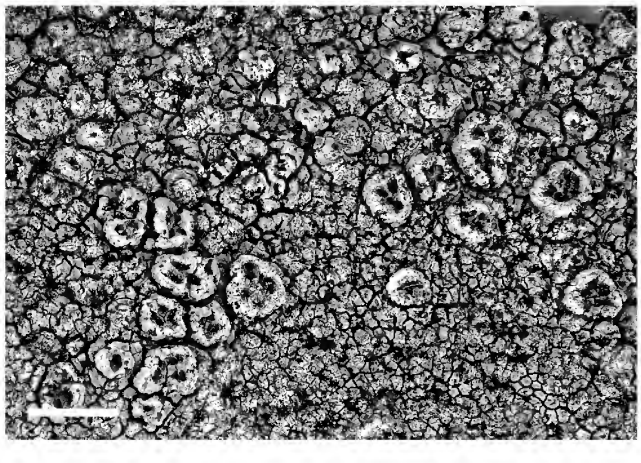

Fig. 64. *Pertusaria crassilabra*. Scale = 2 mm. Photo: J. Jarman.

[a]*Pertusaria krogiae* A.W.Archer, Elix, Eb.Fisch., Killman & Sérus.

Collected from a rotting log in degraded mallee woodland. Characterised by a white crustose thallus containing atranorin (sometimes with lichesterinic acid), and the roundish, tuberculate soralia. The relationships of this species in the light of the recent subdivision of *Pertusaria* (Wei *et al.* 2017) are yet to be determined. *Pertusaria krogiae* was first described from East Africa (Archer *et al.* 2009), and has also been collected in Tasmania (G. Kantvilas, unpubl. observations). Chemical characters are the most reliable means of distinguishing it from the morphologically very similar *Lepra leucosorodes* (above).

Near Kingscote Airport, 35°43'S 137°32'E, 5 m alt., 2015, *G. Kantvilas* 495/15 *& B. de Villiers* (HO).

Pertusaria lophocarpa Körb.

On rocks in dry sclerophyll forest. Characterised by the pale yellowish, crustose thallus containing 4,5-dichlorolichexanthone and 2'-*O*-methylperlatolic acid, with verruciform apothecia, 8-spored asci and ascospores 45–70 × 25–40 µm. **Fig. 65.**

Western River, 1972, *R.D. Seppelt* 820B (HO); Western River Road near Weir Cove, 36°02'S 136°44'E, 20 m alt., 1994, *H. Streimann* 54963 (CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55082, 55084 (CANB); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 751/12 *& B. de Villiers* (AD, HO).

Pertusaria pertractata Stirt.

Widespread on twigs and trunks of understorey trees and shrubs in mallee woodland and dry sclerophyll forest. This is the most common epiphytic member of the large crustose genus *Pertusaria*. It has verruciform apothecia, 8-spored asci, ascospores c. 30–70 × 20–35 µm, and contains 4,5-dichlorolichexanthone and 2'-*O*-methylperlatolic acid. **Illustration:** Archer (2004: 103).

Corner of Playford Hwy, Birchmore Hwy and road to Kingscote aerodrome, 35°42'S 137°31'E, 1982, *K. Stove* 1789 *p.p.* (AD); 3 km E of Seal Bay, 36°00'S 137°21'E, 30 m alt., 1985, *J.A. Elix* 19588 *& L.H. Elix* (CANB); D'Estrees Bay, 35°36'S 137°36'E, 2 m alt., 1985, *J.A. Elix* 19710 *& L.H. Elix* (CANB); 1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuehl s.n. p.p.* (MEL 1052177); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55116A (CANB); near mouth of Willson River, 35°52'S 137°56'E, 1997, *R.J. Bates* 48370 (AD); c. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 120 m alt., 2011, *G. Kantvilas* 288/11 *& B. de Villiers* (HO);

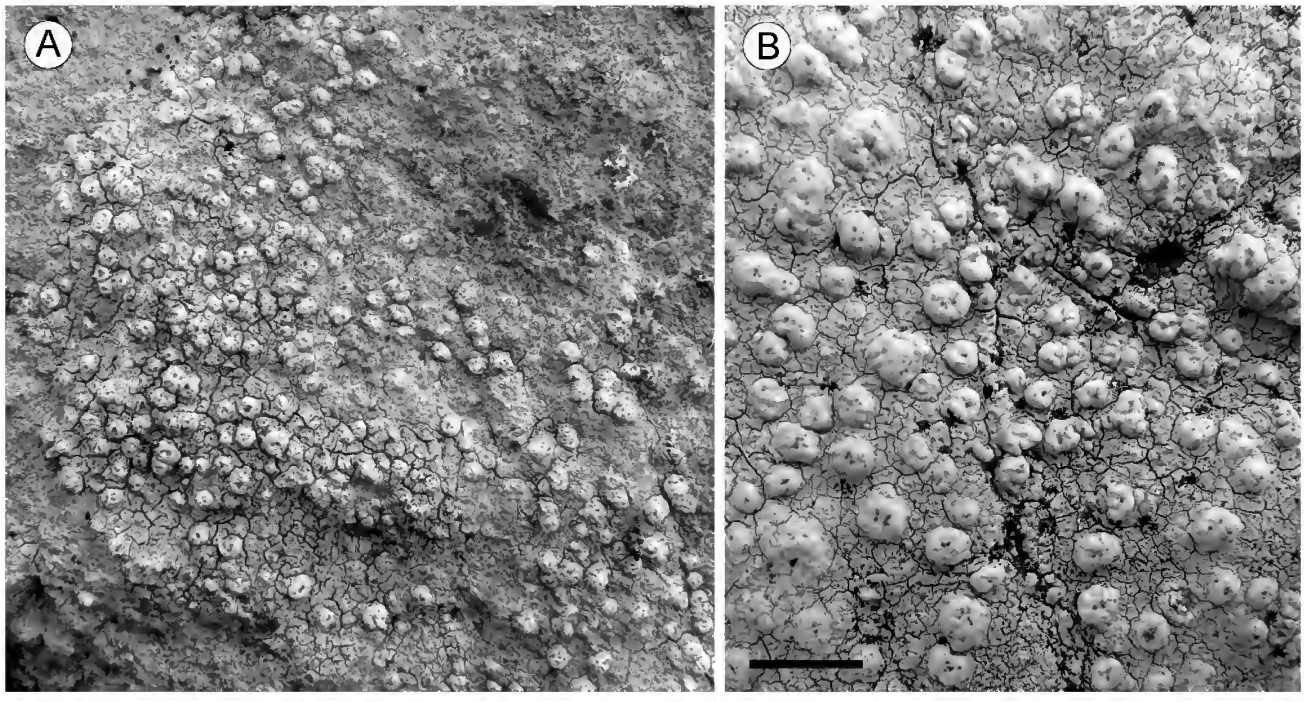

Fig. 65. *Pertusaria lophocarpa*. A Habit. B Detail. Scale = 5 mm.

Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 427/12, 434/12 *& B. de Villiers* (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 576/12 *& B. de Villiers* (AD, HO); southern end of Antechamber Bay, 35°48'S 138°06'E, 10 m alt., 2013, *G. Kantvilas* 200/13 (HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 335/13 *& B. de Villiers* (AD, HO); Ironstone Hills, 35°44'S 137°57'E, 70 m alt., 2015, *G. Kantvilas* 379/15 (AD, HO); South West River, 36°01'S 136°52'E, 10 m alt., 2015, *G. Kantvilas* 425/15 (HO).

[5]*Phaeophyscia endococcinodes* (Poelt) Essl.

On rocks in rough pasture; very rare. This small, dark grey foliose lichen can be recognised by its bright orange, K+ purple underside.

Ironstone Hills, 35°44'S 137°57'E, 60 m alt., 2015, *G. Kantvilas* 384/15 *& B. de Villiers* (HO).

Physcia adscendens (Fr.) H.Olivier

On trees or, more rarely, on rocks, usually in habitats subject to eutrophication such as in the vicinity of sheep paddocks. This cosmopolitan, foliose lichen with diagnostic, helmet-shaped soralia seems to be surprisingly uncommon on the island, even though its typical habitat (e.g. trees fringing pasture) is extremely common.

King George Beach, 35°40'S 137°04'E, 2 m alt., 1985, *J.A. Elix* 19752, 19758 *& L.H. Elix* (CANB); Cape du Couedic Road, 35°46'S 136°45'E, 100 m alt., 2007, *R.W. Rogers* 11503 (BRI); c. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 120 m alt., 2011, *G. Kantvilas* 282/11 *& B. de Villiers* (AD, HO); Creek Bay Farm, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 384/11 (HO).

Physcia albata (F.Wilson) Hale

On foreshore rocks; uncommon. A distinctive, grey foliose species with a pale underside, broadly rounded lobes and laminal soredia.

Western end of Antechamber Bay, 35°48'S 138°05'E, 2 m alt., 1985, *J.A. Elix* 19689 *& L.H. Elix* (CANB).

Physcia neonubila Elix

Widespread on twigs and, more rarely, on rocks, and recognised by the small, grey foliose thallus of narrow lobes with marginal soralia and a pale underside. It contains the '*speciosa*' chemosyndrome (Elix 2011), which distinguishes it from the superficially similar *P. nubila* Moberg.

Chapman River estuary, 35°50'S 138°05'E, 3 m alt., 1985, *J.A. Elix* 19692 *& L.H. Elix* (CANB); D'Estrees Bay, 35°36'S 137°36'E, 2 m alt., 1985, *J.A. Elix* 19709 *& L.H. Elix* (CANB); Flinders Chase National Park, 35°51'S 136°52'E, 1995, *P.C. Heyligers* L256 (CANB); c. 2 km W of South West River, 35°59'30"S 136°50'30"E, 50 m alt., 2007, *R.W. Rogers* 11505 (BRI, HO); Cape Willoughby Road, 35°45'S 137°58'E, 2007, *R.W. Rogers* 11506 (BRI); Creek Bay Farm, headwaters of Lubra Creek, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 378/11, 385/11 (AD, HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 538/15 (HO).

Physcia poncinsii Hue

Widespread and common on twigs and trunks, especially in mallee and eucalypt woodland. This is the most common species of *Physcia* on the island, easily recognised by its small foliose thallus with a pale undersurface and roundish, laminal, crater-like soralia. **Fig. 66A.**

Banks of Cygnet River, 1967, *G. Jackson* 529 (AD); corner of Playford Hwy, Birchmore Hwy and road to Kingscote aerodrome, 35°42'S 137°31'E, 1982, *K. Stove* 1791 *p.p.* (AD); Playford Hwy, 1 km W of Kingscote Airport, 35°43'S 137°31'E, 15 m alt., 1985, *J.A. Elix* 19564, 19570 *& L.H. Elix* (CANB); 3 km E of Seal Bay, 35°59'S 137°21'E, 30 m alt., 1985, *J.A. Elix* 19587 *& L.H. Elix* (CANB); Dudley

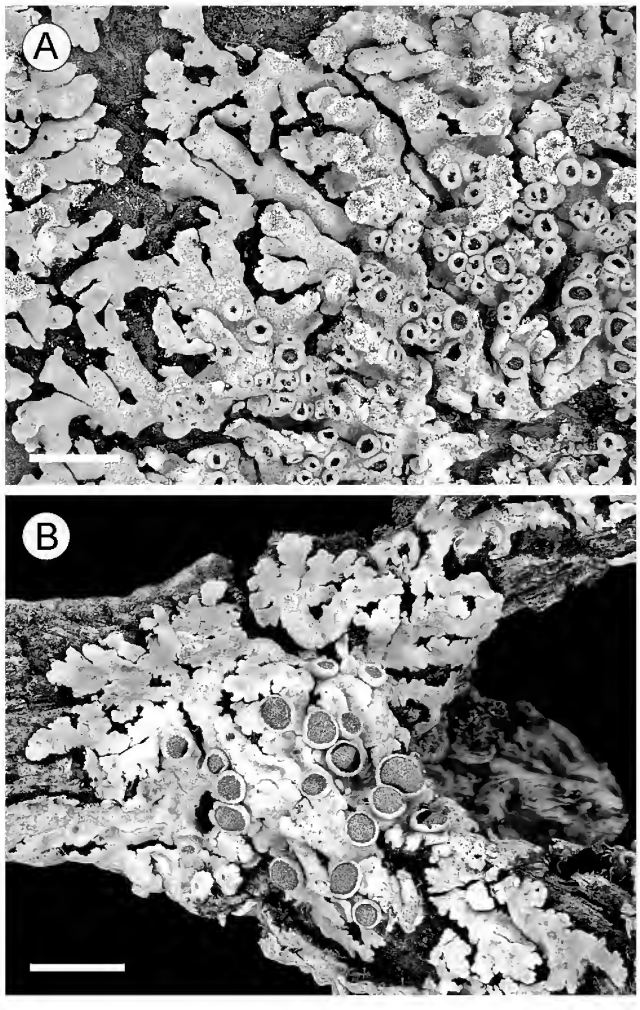

Fig. 66. A *Physcia poncinsii*. **B** *Physcia rolandii*. Scales = 2 mm. Photos: J. Jarman.

Peninsula, 4 km W of Cape Willoughby, 35°50'S 138°05'E, 100 m alt., 1985, *J.A. Elix* 19701, 19702 *& L.H. Elix* (CANB); 1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuehl s.n. p.p.* (MEL); adjacent to American River aerodrome, 35°46'S 137°46'E, 1986, *D.N. Kraehenbuehl s.n. p.p.* (MEL); adjacent to Eleanor River, 3 km E of Little Sahara dunes, 35°57'S 137°17'E, 1989, *D.N. Kraehenbuehl* 5181 *p.p.* (AD); Cape Borda, 35°45'S 136°35'E, 100 m alt., 1994, *H. Streimann* 54902 *p.p.* (AD, CANB); Weir Cove, 36°03'S 136°43'E, 40 m alt., 1994, *H. Streimann* 54980 (CANB); Cape du Couedic Road, 35°46'S 136°45'E, 100 m alt., 2007, *R.W. Rogers* 11504 (BRI); The Red Banks, 35°45'S 137°43'E, 2008, *G. Kantvilas* 327/08 (AD, HO); Cape Borda lighthouse cemetery, 35°45'S 136°38'E, 90 m alt., 2010, *G. Kantvilas* 192/10 (AD, HO); Murray Lagoon, Timber Creek, 35°55'S 137°26'E, 15 m alt., 2011, *G. Kantvilas* 344/11 *& B. de Villiers* (AD, HO); southern end of Antechamber Bay, 35°48'S 138°06'E, 10 m alt., 2013, *G. Kantvilas* 201/13 (HO); North Cape area, 3 km N of Cape Rouge, 35°35'S 137°38'E, 10 m alt., 2013, *G. Kantvilas* 247/13 (AD, HO).

Physcia rolandii Elix

Widely scattered on twigs and characterised by the small, foliose, esorediate, fertile thallus containing the '*speciosa*' chemosyndrome of Elix (2011). **Fig. 66B.**

W of Kingscote Airport, 35°43'S 137°30'E, 1972, *R.D. Seppelt* 2101 (MEL); Playford Hwy, 1 km W of Kingscote Airport, 35°43'S 137°31'E, 15 m alt., 1985, *J.A. Elix* 19571 *& L.H. Elix* (CANB); 3 km E of Seal Bay, 35°59'S 137°21'E, 30 m alt., 1985, *J.A. Elix* 19587B *& L.H. Elix* (CANB); 5 km W of Antechamber Bay, 35°45'S 138°01'E, 160 m alt., 1985, *J.A. Elix* 19683 *& L.H. Elix* (CANB); Harveys Return, carpark above cove, 35°46'S 136°34'E, 60 m alt., 1985, *J.A. Elix* 19738 *& L.H. Elix* (CANB); Bay of Shoals, 35°37'S 137°36'E, 2 m alt., 1985, *J.A. Elix* 19760 *& L.H. Elix* (CANB); 1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuehl* (MEL); West Bay, 35°53'S 136°33'E, 10 m alt., 2011, *G. Kantvilas* 302/11 (AD, HO); Ravine des Casoars, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 488/12 *& B. de Villiers* (AD, HO); North Cape area, 3 km N of Cape Rouge, 35°35'S 137°38'E, 10 m alt., 2013, *G. Kantvilas* 249/13 (HO); Hanson Bay Track, c. 1 km SW of Grassdale Lagoon, 36°00'S 136°52'E, 50 m alt., 2015, *G. Kantvilas* 301/15 *& B. de Villiers* (HO).

Placidium pilosellum (Breuss) Breuss

On consolidated calcareous soil and soft, coarse-grained limestone in coastal heathland, mostly in sheltered crevices. The genus *Placidium* is distinguished from other squamulose members of the Verrucariaceae by having uniseriate, simple ascospores in cylindrical asci. *Placidium pilosellum* is distinguished from *P. squamulosum* (below) by having pycnidia that are marginal and protruding (rather than laminal and immersed) (Breuss 2001).

Stokes Bay, 35°34'S 137°13'E, 1972, *R.D. Seppelt* 751 (HO); Cape Du Couedic, 36°03'S 136°42'E, 80 m alt., 1985, *J.A. Elix* 19619 *& L.H. Elix* (CANB); Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 527/12 *& B. de Villiers* (HO); same locality, 2013, *G. Kantvilas* 292/13 *& B. de Villiers* (HO); Cape St Albans, 35°48'S 138°07'E, 40 m alt., 2015, *G. Kantvilas* 391/15 (AD, HO); c. 1.5 km SW of Point Ellen, 36°00'S 137°11'E, 10 m alt., 2015, *G. Kantvilas* 437/15 (AD, HO).

Placidium sqamulosum (Ach.) Breuss

On consolidated soil in a gap in mallee woodland, associated with *Psora decipiens*. The single specimen seen is sterile, and so the determination is tentative.

Lashamar Conservation Park, c. 2 km S of Cape Coutts, 35°47'S 138°04'E, 50 m alt., 2015, *G. Kantvilas* 433/15 *& B. de Villiers* (HO).

[s]*Placynthiella icmalea* (Ach.) Coppins & P.James

On the bark of *Exocarpos* in dry sclerophyll forest. This species typically occurs on rotting logs, charcoal or on soil with a high organic content, so this Kangaroo Island record is unusual. The single specimen is sterile but nevertheless displays the characteristic granular-coralloid thallus that contains gyrophoric acid.

Rocky River near bridge on West Bay Road, 35°56'S 136°37'E, 10 m alt., 2015, *G. Kantvilas* 520/15 (HO).

Placynthium nigrum (Huds.) Gray *sens. lat.*

On outcrops of limestone in coastal heathland and rough pasture. The taxon recorded from Kangaroo Island (and also known from Tasmania) has a granular-isidiate thallus, lacks a prothallus and has exclusively

1-septate ascospores, (9–) 10–13 × 6–7.5 (–8) µm, that are slightly constricted at the septum. *Placynthium nigrum* in the strict sense has 1–3-septate ascospores that are somewhat narrower (4–6 µm; McCarthy & Kantvilas 2014).

Cape Borda, 35°45'S 136°35'E, 100 m alt., 1994, *H. Streimann* 54956 (AD, CANB); track to Cape Gantheaume, 36°04'S 137°27'E, 2008, *G. Kantvilas* 321/08 (AD, HO); Ravine des Casoars, 35°48'S 136°35'E, 5 m alt., 2012, *G. Kantvilas* 453/12 *& B. de Villiers* (AD, HO); Point Ellen, 36°00'S 137°11'E, 5 m alt., 2013, *G. Kantvilas* 214/13 (AD, HO).

[5]*Polymeridium catapastum* (Nyl.) R.C.Harris

An inconspicuous pyrenocarpous crustose lichen found on wood and bark in pasture, mallee woodland and dry sclerophyll forest. It has *Trentepohlia* as the photobiont, branched and anastomosing paraphysoids and 3-septate ascospores, 20–32 × 5–10 µm.

Approx. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 100 m alt., 2010, *G. Kantvilas* 202/10 (HO); Pelican Lagoon, 35°49'S 137°48'E, 10 m alt., 2011, *G. Kantvilas* 280/11 (AD, HO); Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2013, *G. Kantvilas* 230/13 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 5 m alt., 2013, *G. Kantvilas* 355/13 *& B. de Villiers* (HO).

Porina corrugata Müll.Arg.

A rather common species on the twigs of coastal shrubs, recognised by the conspicuous, lumpy, wrinkled, grey-green perithecia with 3-septate ascospores, 19–23 × 3–6 µm. **Fig. 67.**

Frank Potts Gully, 35°45'S 137°45'E, 2008, *G. Kantvilas* 320/08 (AD, HO); Remarkable Rocks, 36°02'S 136°45'E, 2008, *G. Kantvilas* 324/08 (AD, CANB, HO); Seal Bay, 35°59'S 137°19'E, 40 m alt., 2010, *G. Kantvilas* 219/10 (AD, HO); Point Ellen, 36°00'S 137°11'E, 3 m alt., 2013, *G. Kantvilas* 219/13 (AD, HO); Stokes Bay, 35°37'S 137°13'E, 60 m alt., 2013, *G. Kantvilas* 291/13 *& B. de Villiers* (HO).

[5]*Porina subargillacea* Müll.Arg.

A tiny, inconspicuous, crustose lichen with black perithecia and 7–9-septate, fusiform ascospores, 28–57 × 2.5–5.5 µm, found on twigs in woodland where it is associated with *Pertusaria pertractata*, *Buellia dissa* and species of *Caloplaca*.

Corner of Playford Hwy, Birchmore Hwy and road to Kingscote aerodrome, 35°42'S 137°31'E, 1982, *K. Stove* 1789 *p.p.* (AD); Creek Bay Farm, headwaters of Lubra Creek, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 379/11A (HO); Red House Bay, 35°49'S 138°06'E, 15 m alt., 2013, *G. Kantvilas* 319/13 (HO).

[5]*Porina whinrayi* P.M.McCarthy

On rocks in shaded underhangs. This species is typically found at the coast whereas the single Kangaroo Island specimen seen is from the hinterland, near the base of a waterfall. It is readily distinguished from other Australian, black-fruited *Porina* species by its submuriform ascospores.

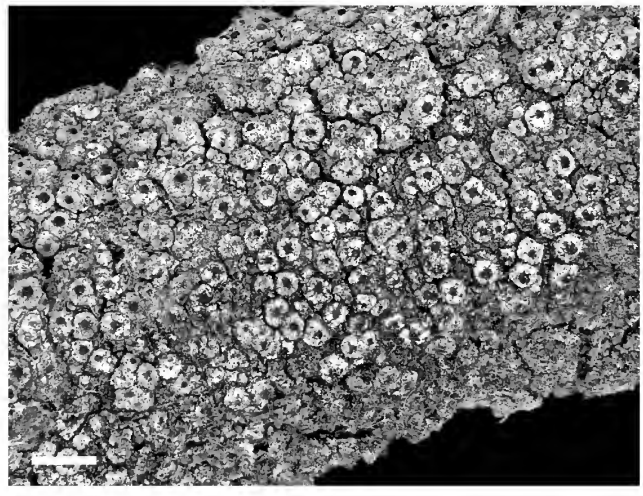

Fig. 67. *Porina corrugata*. Scale = 1 mm. Photo: J. Jarman.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 785/12A (HO).

Porpidia cf. *crustulata* (Ach.) Hertel & Knoph

On rocks in dry sclerophyll forest; locally common on cobbles on disused roads and tracks. Kangaroo Island collections have apothecia to c. 1 mm wide, a proper exciple 50–100 µm thick, an unusually pale hypothecium, ascospores 12–20 × 7–10 µm, and contain no substances detectable by t.l.c.

Middle River EWS Reserve, 35°44'S 137°04'E, 1989, *D.N. Kraehenbuehl* 5170 (AD); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 564/12, 760/12 *& B. de Villiers* (HO, MSC).

[5]*Pseudocyphellaria aurata* (Sm.) Vainio

Extremely rare, and known today from a single, small population on a few old eucalypt trunks in moist mallee

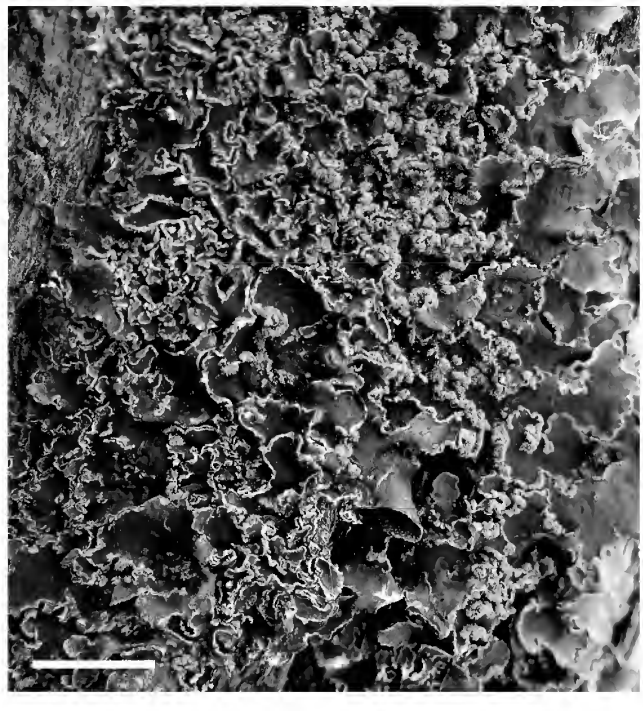

Fig. 68. *Pseudocyphellaria aurata*. Scale = 10 mm.

Fig. 69. *Pseudocyphellaria neglecta*. Scale = 10 mm.

woodland. This highly conspicuous species has a bright green, lettuce-like thallus with a yellow underside and yellow, chiefly marginal soredia. It was the focus of several intensive searches in moist woodland habitats. The record dating from 1978, presumably from the vicinity of Lashmar Lagoon on the Dudley Peninsula, could not be reconfirmed, although the area, which was searched thoroughly, supports highly degraded, swampy *Melaleuca* woodland where *P. aurata* might well have occurred in the past. This species was recently transferred to the genus *Crocodia* by Galloway & Elix (2013), but I have elected to retain it in *Pseudocyphellaria* here. **Fig. 68.**

Dudley Peninsula, 1.5 km along Lagoon Road, 1978, *E.M. Martin* (AD); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 342/13 *& B. de Villiers* (AD, HO).

Pseudocyphellaria neglecta (Müll.Arg.) H.Magn.

On rocks, usually in moist, shaded microhabitats. This is a conspicuous, brown foliose lichen with marginal and laminal phyllidia and yellow, punctiform pseudocyphellae. **Fig. 69.**

Mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55070 (AD, CANB); same locality, 1994, *H.T. Lumbsch* 10922 (AD, CANB); Pink Bay, 35°50'S 138°07'E, 10 m alt., 2010, *G. Kantvilas* 210/10 (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 783/12 (AD, HO).

Psora crystallifera (Taylor) Müll.Arg.

On consolidated soil, typically associated with *P. decipiens*, *Diploschistes* and other terricolous crustose species. It is recognised by the squamulose thallus in which the upper surface is deeply cracked into irregular polygons, and by the absence of lichen substances. **Illustration:** Eldridge & Tozer (1997: Fig. 4.18).

Near King George Beach, 35°39'S 137°07'E, 10 m alt., 2011, *G. Kantvilas* 331/11 *& B. de Villiers* (AD, HO).

Psora decipiens (Hedw.) Hoffm.

On consolidated, typically calcareous soil in open areas, such as lightly grazed, rough pasture, amongst rocks in heathland or at the margins of mallee woodland. This species is very localised on the island. It is characterised by roundish, pink, orange or reddish brown, often at least partially pale grey-pruinose squamules to c. 5 mm wide, with usually upturned, ragged or crenulate margins and blackish, marginal, immarginate apothecia to 2 mm wide (see Timdal 2002). This is a very variable species chemically and morphologically. Specimens

Fig. 70. *Psora decipiens*, growing together with the yellow thallus of *Gyalolechia cranfieldii*. Scale = 5 mm.

from Kangaroo Island contain norstictic acid, or an unknown substance (that appears as a slow-moving yellow spot on developed t.l.c. plates), or nil substances, sometimes within the same population. **Fig. 70.**

4 km S of Emu Bay, 1972, *R.D. Seppelt* 697 (HO); 1.6 km from Seal Bay, 1972, *R.D. Seppelt* 2027 (HO); [without locality] 2000, *E. Hogan s.n.* (MEL); Willson River Road, 35°50'S 138°01'E, 30 m alt., 2011, *G. Kantvilas* 247/11 (AD, HO); near King George Beach, 35°39'S 137°07'E, 10 m alt., 2011, *G. Kantvilas* 332/11 *& B. de Villiers* (AD, HO); Stokes Bay, 35°37'S 137°13'E, 50 m alt., *G. Kantvilas* 523/12, 524/12 *& B. de Villiers* (AD, HO); North Cape Road, 35°36'S 137°35'E, 5 m alt., 2013, *G. Kantvilas* 255/13, 256/13 *& B. de Villiers* (HO); Hanson Bay Track, c. 1 km S of Grassdale Homestead, 36°00'S 136°52'E, 5 m alt., 2015, *G. Kantvilas* 369/15 *& B. de Villiers* (AD, HO); Lashmar Conservation Park, c. 2 km S of Cape Coutts, 35°47'S 138°04'E, 50 m alt., 2015, *G. Kantvilas* 435/15 *& B. de Villiers* (HO); c. 1.5 km SW of Point Ellen, 36°00'S 137°11'E, 10 m alt., 2015, *G. Kantvilas* 436/15 (AD, HO); Rocky River Track, c. 1 km S of Snake Lagoon, 35°58'S 136°39'E, 50 m alt., 2015, *G. Kantvilas* 508/15 *& B. de Villiers* (AD, HO).

[T]*Psoroglaena halmaturina* P.M.McCarthy & Kantvilas

Known only from Kangaroo Island, where it was collected from the base of eucalypts in roadside mallee, and from the twigs of *Melaleuca* in coastal woodland. At both locations, the habitat was highly degraded and fragmented. This remarkable species is recognised by its granular to squamulose thallus, tiny, blackish perithecia c. 0.3 mm wide, and 7-septate ascospores. **Illustration:** McCarthy & Kantvilas (2013a: Fig. 1).

Moffatt Road, 35°49'S 138°00'E, 70 m alt., 2011, *G. Kantvilas* 253/11 *& B. de Villiers* (HO) [type]; Ravine des Casoars, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 487/12 *& B. de Villiers* (AD, HO).

[S]*Punctelia borreri* (Sm.) Krog

On eucalypt bark in mallee woodland. The sole Kangaroo Island record is a fragment of thallus, separated from a specimen of *Physcia neonubila*; it nevertheless displays the diagnostic features of a grey foliose thallus with punctiform pseudocyphellae, a black underside and a C+ red medulla.

Cape Willoughby Road, 35°45'S 137°58'E, 2007, *R.W. Rogers* 11506 *p.p.* (BRI).

Punctelia pseudocoralloidea (Gyeln.) Elix & Kantvilas

On bark and wood, mainly in mallee woodland and dry sclerophyll forest. In the past, all sorediate Australian specimens of *Punctelia* with a pale lower surface and a C+ red medulla would have been ascribed to *P. subrudecta* (Nyl.) Krog, a name based on a type specimen from the island of St Paul in the southern Indian Ocean. That species is now perceived to be heterogeneous (van Herk & Aptroot 2000). The *P. subrudecta* complex and the placement of Kangaroo Island specimens is yet to be fully resolved, but the name *P. pseudocoralloidea* is based on a type from mainland Australia. **Fig. 71.**

American River, 35°46'S 137°47'E, 2007, *R.W. Rogers* 11502 (BRI); The Kona, Antechamber Bay, 35°49'S 138°05'E, 50 m alt., 2010, *G. Kantvilas* 196/10 (AD, HO); Lashmar Lagoon, 35°48'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 261/11, 268/11 *& B. de Villiers* (AD, HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 424/12 *& B. de Villiers* (HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 573/12 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 344/13 *& B. de Villiers* (AD, HO); Pelican Lagoon Conservation Park, along Mitchell Drive, 35°48'S 137°48'E, 10 m alt., 2015, *G. Kantvilas* 310/15 (AD, HO).

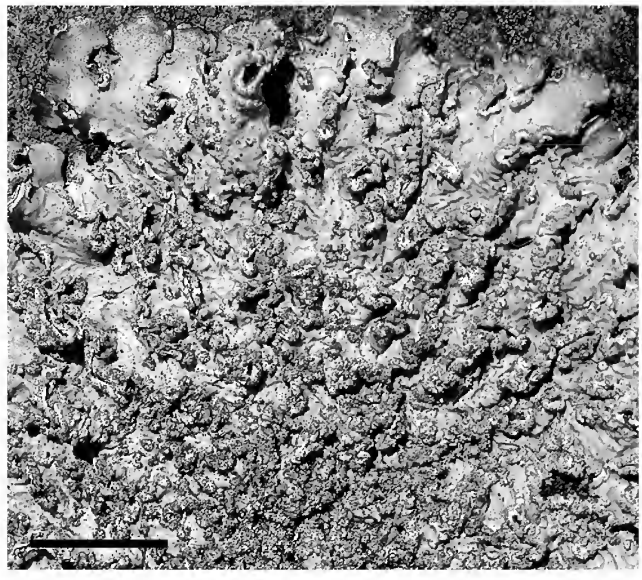

Fig. 71. *Punctelia pseudocoralloidea*. Scale = 5 mm. Photo: J. Jarman.

Punctelia subalbicans (Stirt.) D.J.Galloway

On *Allocasuarina* in dry sclerophyll forest; seemingly very rare on the island. Characterised by the esorediate, grey, foliose thallus with a pale underside, marginal pseudocyphellae and a C+ red medulla (lecanoric acid).

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 571/12 *& B. de Villiers* (HO).

Pyrenopsis sp.

On seasonally submerged rocks in a fast-flowing freshwater stream. This species is a further member of a potentially rich but as yet under-collected assemblage of cyanophilic lichens which occurs in aquatic or semi-aquatic habitats (see Fig. 13). It is recognised by its blackish, crustose thallus that contains a reddish (in section) *Gloeocapsa* photobiont, and the immersed apothecia with 8-spored asci with a thickened apex. The genus is poorly known in the Australian region, but a similar species has been collected in Tasmania.

Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 547/15 (HO).

Ramalina canariensis J.Steiner

On twigs, mostly in coastal vegetation. This is the most common sorediate species of *Ramalina* recorded for the island. It is characterised by flattened, yellow-green lobes and by the presence of usnic and divaricatic acids.

The soredia arise at the thallus margins by the splitting apart of the upper and lower surfaces.

Lockwood Corner, 35°39'S 137°38'E, 1967, *G. Jackson* 524A (AD); Brown Beach, 35°46'S 137°53'E, 3 m alt., 1994, *H. Streimann* 55145, 55146, 55148, 55150 (CANB); Western Cove Road, 35°44'S 137°35'E, 2 m alt., 2011, *G. Kantvilas* 309/11 (HO); Pelican Lagoon, 35°49'S 137°48'E, 10 m alt., 2012, *G. Kantvilas* 405/12 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 354/13 *& B. de Villiers* (HO).

[5]*Ramalina celastri* (Spreng.) Krog & Swinscow

Widespread and common on twigs in mallee and eucalypt woodland. This species is characterised by the relatively broad, flat, strap-shaped, yellow-green lobes, the abundant laminal and marginal apothecia, and the presence of usnic acid only. Stevens (1987) recognised two subspecies of *R. celastri*, with all Kangaroo Island material ascribed to *R. celastri* subsp. *ovalis* (Hook.f. & Taylor) G.N.Stevens (≡ *R. ovalis* Hook.f. & Taylor). However, in accordance with recent regional floras (e.g. Galloway 2007), I am treating all specimens at specific rank only. **Fig. 72.**

End of Old Bullock Track, Kingscote, 35°39'S 137°38'E, 1967, *G. Jackson* 522 (AD); near Lockwood Corner, Kingscote, 35°39'S 137°38'E, 1967, *G. Jackson* 528 (AD); Kohinoor end of Old Bullock Track, 35°46'S 137°24'E, 1967, *G. Jackson* 571 (AD); N of Murray Lagoon, 35°55'S 137°25'E, 1972, *R.D. Seppelt* 2076 (MEL); W of Kingscote Airport, 35°43'S 137°30'E, 1972, *R.D. Seppelt* 2098, 2099 (MEL); Playford Hwy, 1 km W of Kingscote Airport, 35°43'S 137°31'E, 1985, *J.A. Elix* 19567 *& L.H. Elix* (CANB); Dudley Peninsula, 4 km W of Cape Willoughby, 35°50'S 138°05'E, 100 m alt., 1985, *J.A. Elix* 19698 *& L.H. Elix* (CANB); 1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuehl s.n.* (MEL); Brown Beach, 35°46'S 137°53'E, 3 m alt., 1994, *H. Streimann* 55151 (CANB); Brown Beach, 35°48'S 137°50'E, 5 m alt., 2007, *R.W. Rogers* 11492 (BRI); c. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 100 m alt., 2010, *G. Kantvilas* 203/10 (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 356/13 *& B. de Villiers* (AD, HO); near Kingscote Airport along Aranmore Road, 35°43'S 137°33'E, 5 m alt., 2015, *G. Kantvilas* 498/15 *& B. de Villiers* (HO).

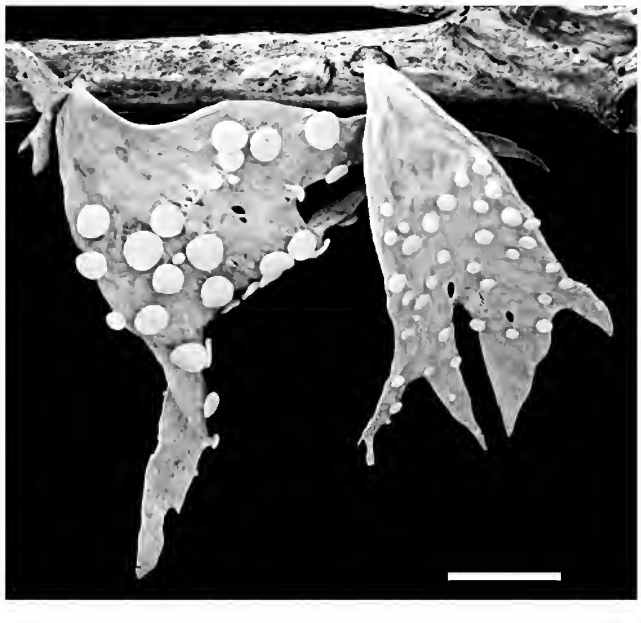

Fig. 72. *Ramalina celastri*. Scale = 5 mm. Photo: J. Jarman.

Ramalina fissa (Müll.Arg.) Vainio

Widespread on twigs in mallee and scrubby heathland; the most common species of *Ramalina* found on the island. It is characterised by the rather cushion-like, compact, yellow-green thallus of flattened or inflated and lacerate lobes, with mostly terminal apothecia; the presence of salazinic acid (usually together with usnic acid) is diagnostic (see Stevens 1987). Several of the specimens examined also contain scabrosin. This species can be extremely variable morphologically. In exposed habitats, thalli are particularly compact and barely 1 cm tall; in moister or shaded habitats, the thallus becomes rather loose, inflated and up to 3 cm tall. The latter form resembles, and indeed has been mis-identified in herbarium collections as, *R. inflata*, but that species never contains salazinic acid (see below). **Fig. 73.**

Old Bullock Track, Kingscote, 35°39'S 137°38'E, 1967, *G. Jackson* 520 (AD); near Lockwood Corner, Kingscote, 35°39'S 137°38'E, 1967, *G. Jackson* 527 (AD); Kingscote Council quarries, 35°39'S 137°38'E, 1971, *G. Jackson* 773, 774, 775 (AD); Murray Lagoon, 35°55'S 137°25'E, 1972, *R.D. Seppelt* 2065, 2056 (MEL); W of Kingscote Airport, 35°43'S 137°30'E, 1972, *R.D. Seppelt* 2097, 2101 (MEL); Dudley Peninsula, 1.5 km along Lagoon Road, 1978, *E.M. Martin* (AD); D'Estrees Bay, 35°56'S 137°37'E, 1982, *G. Jackson* 1530 (AD); Bunker Hill, c. 7 km S of Rocky River Homestead, 36°01'S 136°44'E, 1982, *K. Stove* 1605 (AD); creek crossing on Amen Corner to Kohinoor Mine Road, 35°41'S 137°13'E, 1982, *K. Stove* 1779, 1781 (AD); Playford Hwy, 1 km W of Kingscote Airport, 35°43'S 137°31'E, 1985, *J.A. Elix* 19563, 19568, 19574, 19576, 19666 *& L.H. Elix* (*J.A. Elix: Lich. Australas. Exsicc.*: 121) (CANB, HO, MEL); 13 km NE of Vivonne Bay, 35°55'S 137°16'E, 30 m alt., 1985, *J.A. Elix* 19582 *& L.H. Elix* (CANB); 3 km E of Seal Bay, 36°00'S 137°21'E, 30 m alt., 1985, *J.A. Elix* 19583 *& L.H. Elix* (CANB); S of Wisanger Hills Homestead, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19653 *& L.H. Elix* (CANB); Chapman River estuary, 35°50'S 138°05'E, 3 m alt., 1985, *J.A. Elix* 19695 *& L.H. Elix* (CANB); Dudley Peninsula, 4 km W of Cape Willoughby, 35°50'S 138°05'E, 100 m alt., 1985, *J.A. Elix* 19699 *& L.H. Elix* (CANB); 1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuehl s.n.* (MEL); adjacent to Eleanor River, 3 km E of Little Sahara sand dunes, 35°57'S 137°17'E, 1989, *D.N. Kraehenbuehl* 5179, 5182 (AD); Brown Beach, 35°46'S 137°53'E, 3 m alt., 1994, *H. Streimann* 55149 (CANB); Brown Beach, 35°48'S 137°50'E, 5 m alt., 2007, *R.W. Rogers* 11491 (BRI); Cape Willoughby Road, 35°50'S 138°06'E, 110 m alt., 2011, *G. Kantvilas* 323/11 (AD, HO); Murray Lagoon, Timber Creek, 35°55'S 137°26'E, 15 m alt., 2011, *G. Kantvilas* 338/11, 339/11 *& B. de Villiers* (AD, HO).

Ramalina glaucescens Kremp.

A common epiphytic species in woodland and coastal scrub, characterised by flat, strap-shaped, often lacerate

Fig. 73. *Ramalina fissa*. The terminal apothecia are concolorous with the cushion-like thallus. Scale = 10 mm. Photo: J. Jarman.

branches with axillary, marginal or sub-terminal apothecia. It is chemically variable (Stevens 1987), but all specimens analysed from Kangaroo Island contain usnic acid only (typically only in trace amounts). **Fig. 74.**

Lockwood Corner, 35°39'S 137°38'E, 1967, *G. Jackson* 524B (AD); end of Old Bullock Track, Kingscote, 35°39'S 137°38'E, 1967, *G. Jackson* 532 (AD); 17 km SSW of Kingscote, 1972, *R.D. Seppelt* 2232 (HO); Dudley Peninsula, 1.5 km along Lagoon Rd., 1978, *E.M. Martin* (AD); Playford Hwy, 1 km W of Kingscote Airport, 35°43'S 137°31'E, 1985, *J.A. Elix* 19566, 19668 *& L.H. Elix* (CANB); Cygnet River, 35°42'S 137°32'E, 1997, *R.J. Bates* 48339 (AD); Brown Beach, 35°48'S 137°50'E, 5 m alt., 2007, *R.W. Rogers* 11490 (BRI); Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2010, *G. Kantvilas* 212/10 (AD, HO); Nepean Bay, 35°44'S 137°36'E, 2 m alt., 2011, *G. Kantvilas* 317/11 (HO); Timber Creek, Murray Lagoon, 35°55'S 137°26'E, 15 m alt., 2011, *G. Kantvilas* 342/11 *& B. de Villiers* (AD, HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 430/12, 432/12 *& B. de Villiers* (AD, HO); near Kingscote Airport along Aranmore Road, 35°43'S 137°33'E, 5 m alt., 2015, *G. Kantvilas* 497/15 *& B. de Villiers* (AD, HO).

[5]*Ramalina inflata* (Hook.f. & Taylor) Hook.f. & Taylor

Stevens (1987) recognised several infra-specific taxa within *R. inflata*, of which two, subsp. *inflata* and subsp. *australis* G.N.Stevens, might well occur on Kangaroo Island. However, I have been unable to satisfactorily determine to which subspecies the specimens examined belong. All are significantly inflated and in part lacerate, and have been collected from twigs in mallee and scrub. Both divaricatic acid-containing and sekikaic acid-containing specimens have been collected.

Kohinoor end of Bullock Track, 35°39'S 137°38'E, 1967, *G. Jackson* 572 (AD); Cape Gantheaume Conservation Park, c. 2 km S of entrance, 36°00'S 137°36'E, 1982, *K. Stove* 1513 (AD); corner of Playford Hwy, Birchmore Hwy and road to Kingscote aerodrome, 35°42'S 137°31'E, 1982, *K. Stove* 1793 (AD); Harveys Return, 35°46'S 136°34'E, 60 m alt., 1985, *J.A. Elix* 19739 *& L.H. Elix* (CANB); along banks of Middle River, 35°44'S 137°04'E, 1989, *D.N. Kraehenbuehl* 5158 (AD); Weir Cove, 36°03'S 136°43'E, 40 m alt., 1994, *H.T. Lumbsch* 10914, *A. Dickhäuser & H. Streimann* (CANB); same locality, 1994, *H. Streimann* 54979 (CANB); Brown Beach, 35°46'S 137°53'E, 3 m alt., 1994, *H. Streimann* 55144, 55147 (CANB). c. 2 km W of South West River, 35°59'S 136°50'E, 50 m alt., 2007, *R.W. Rogers* 11489 (BRI).

Fig. 74. *Ramalina glaucescens*. Scale = 10 mm. Photo: J. Jarman.

[5]*Ramalina unilateralis* F.Wilson

On twigs in dry sclerophyll forest. This species is similar to *R. canariensis* and is likewise sorediate and contains usnic and divaricatic acids. It differs by being more finely divided and having the soredia arising by the splitting open of the lower surface.

Approx. 2 km W of South West River, 35°59'S 136°50'E, 50 m alt., 2007, *R.W. Rogers* 11488 (BRI, HO).

[5]*Ramboldia blastidiata* Kantvilas & Elix

On exposed rocks in dry sclerophyll forest, typically forming extensive, brown, sorediate-blastidiate thalli with red-brown apothecia and containing norstictic acid. It is noteworthy that the non-sorediate counterpart of this species, the widespread *R. petraeoides* (C.Bab. & Mitten) Kantvilas & Elix, has not been recorded for the island.

Cygnet River, Stokes Bay Road, 41 km WSW of Kingscote, 35°44'S 137°13'E, 110 m alt., 1994, *H. Streimann* 54888 (CANB); Waterfall Creek, 30 km ENE of Cape Borda, 35°42'S 136°54'E, 140 m alt., 1994, *H. Streimann* 54949 (CANB); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 554/12, 765/12 *& B. de Villiers* (AD, HO); Ironstone Hills, 35°44'S 137°57'E, 70 m alt., 2015, *G. Kantvilas* 383/15 (AD, HO).

Ramboldia crassithallina Kalb

Locally abundant on bleached or rotting wood in woodland and pasture. Recognised by the areolate-bullate, grey thallus containing thamnolic acid (K+ yellow) and the glossy black apothecia. **Fig. 75A.**

Clay pan, c. 4 km ESE of car park at West Bay, 35°54'S 136°35'E, 1982, *K. Stove* 1677 *p.p.* (AD); near mouth of Chapman River, 35°47'S 138°04'E, 10 m alt., 2009, *G. Kantvilas* 352/09 (AD, HO); Antechamber Bay near The Kona, 35°49'S 138°05'E, 20 m alt., 2010, *G. Kantvilas* 206/10 (AD, HO); Lashmar Lagoon, 35°48'S 138°04'E, 10 m alt., *G. Kantvilas* 258/11 *& B. de Villiers* (AD, HO, MSC); Chapman River, 35°48'S 138°04'E, 2 m alt., 2011, *G. Kantvilas* 370/11 *& B. de Villiers* (HO); Western Cove, 35°44'S 137°35'E, 0.5 m alt., 2013, *G. Kantvilas* 233/13 (AD, HO); Pelican Lagoon Conservation Park, along Mitchell Drive, 35°48'S 137°48'E, 10 m alt., 2015, *G. Kantvilas* 311/15 (HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 328/15 (AD, HO).

Ramboldia laeta (Stirt.) Kalb, Lumbsch & Elix

A widespread crustose lichen on twigs in mallee and heathland. As with most species of the genus *Caloplaca*, *Ramboldia laeta* has vivid red apothecia that react K+ purple. However, it is easily distinguished by its simple (rather than polardiblastic) ascospores and its *Lecanora*-type (rather than *Teloschistes*-type) asci. **Fig. 75B.**

Approx. 0.75 km SE of Amen Corner, 35°41'S 137°12'E, 1982, *K. Stove* 1780 *p.p.* (AD); Ravine des Casoars, 35°48'S 136°37'E, 20 m alt., 1985, *J.A. Elix* 19730 *& L.H. Elix* (CANB); same locality, 70 m alt., 1994, *H.T. Lumbsch* 10906a (CANB); West Bay, 35°53'S 136°33'E, 10 m alt., 2011, *G. Kantvilas* 296/11 (HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 315/15 (HO).

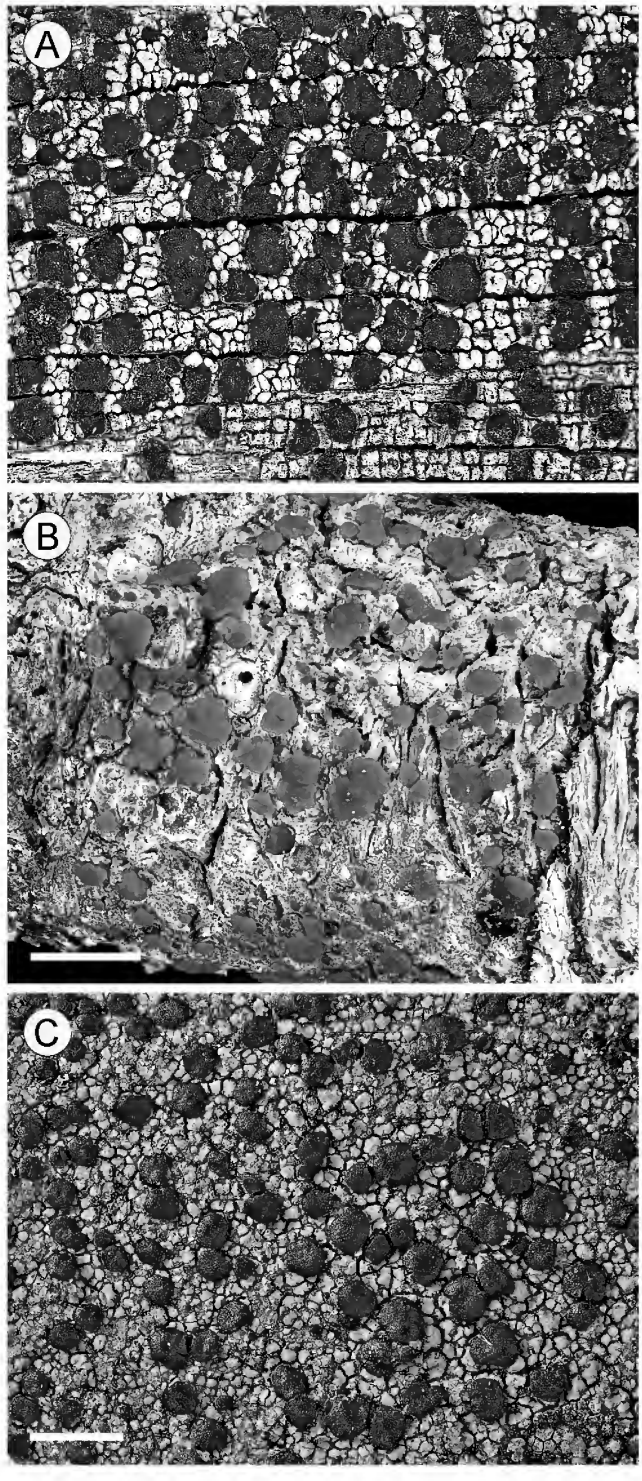

Fig. 75. A *Ramboldia crassithallina*. **B** *Ramboldia laeta*. **C** *Ramboldia plicatula*. Scales = 2 mm. Photos: J. Jarman.

Ramboldia plicatula (Müll.Arg.) Kantvilas & Elix

On rocks in dry sclerophyll forest. Characterised by the pale brownish, rather lumpy, crustose thallus containing baeomycesic and squamatic acids, and by the glossy, brown-black apothecia with simple ascospores. **Fig. 75C.**

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 558/12 *& B. de Villiers* (AD, HO); Lathami Conservation Park, 35°38'S 137°14'E, 160 m alt., 2015, *G. Kantvilas* 292/15 *& B. de Villiers* (HO).

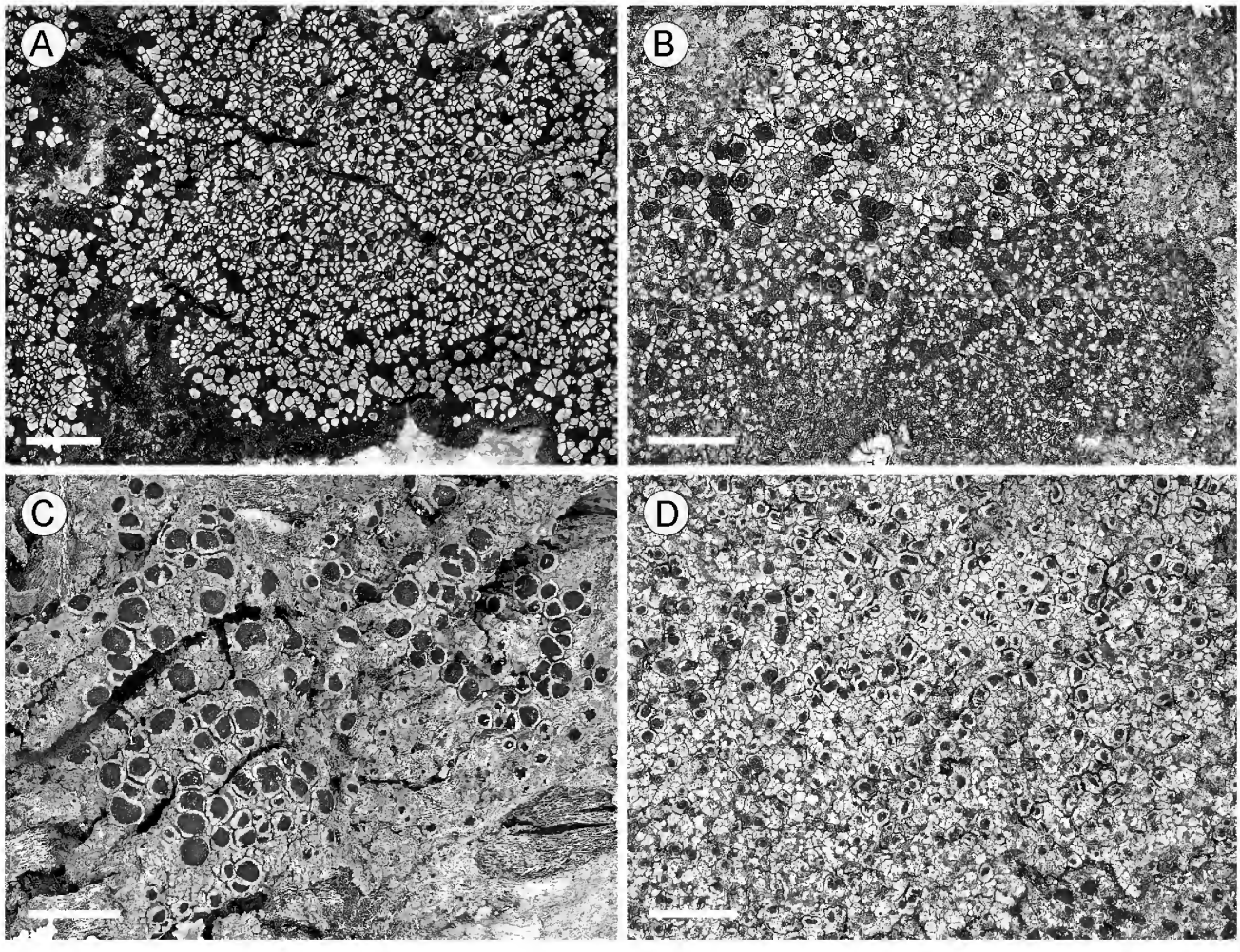

Fig. 76. A *Rhizocarpon geographicum*. **B** *Rhizocarpon reductum*. **C** *Rinodina australiensis*. **D** *Rinodina thiomela*. Scale (A) = 5 mm. Scales (B–D) = 2 mm. Photos: J. Jarman.

[s]*Ramboldia sorediata* Kalb

On eucalypt lignin in mallee woodland. This species is readily distinguished from others in the genus by its whitish, finely sorediate thallus that contains thamnolic acid (K+ yellow), features that enable its identification even when it lacks its characteristic glossy, black apothecia.

Approx. 1 km SSW of Kelly Hill Caves, 36°00'S 136°54'E, 40 m alt., 2015, *G. Kantvilas* 352/15 *& B. de Villiers* (HO).

Ramboldia stuartii (Hampe) Kantvilas & Elix

On bleached, dead eucalypt wood in dry sclerophyll forest. This very distinctive species is recognised by its rather adnate, glossy, black apothecia that contrast sharply with the pale substratum, and by the presence of hypothamnolic acid, detected in apothecial sections as K+ violet granules in the hypothecium.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 583/12 *& B. de Villiers* (AD, HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 329/15 (AD, HO).

Rhizocarpon geographicum (L.) DC.

On sandstone boulders in coastal heathland and dry sclerophyll forest. This is a most distinctive saxicolous crustose lichen, recognised by its speckled yellow-green and black thallus. **Fig. 76A.**

Approx. 3.5 km NE of Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 535/12 *& B. de Villiers* (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 754/12 *& B. de Villiers* (AD, HO); Ironstone Hills, 35°44'S 137°57'E, 60 m alt., 2015, *G. Kantvilas* 385/15 *& B. de Villiers* (HO).

Rhizocarpon reductum Th.Fr.

On sandstone in dry sclerophyll forest and mallee woodland. Characterised by the brownish or dull grey thallus containing stictic acid, the black, distinctly marginate apothecia, and the 8-spored asci with hyaline, muriform ascospores, 20–35 × 10–15 µm. **Fig. 76B.**

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 559/12 *& B. de Villiers* (HO); Cannery Walking Track, American River, 2013, *A. Wells s.n.* (HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 327/13 *& B. de Villiers* (AD, HO); Lathami Conservation Park, 35°38'S 137°14'E, 160 m alt., 2015, *G. Kantvilas* 295/15 *& B. de Villiers* (HO).

Rinodina asperata (Shirley) Kantvilas

On bark and dead wood in heathland, woodland and rough pasture. Characterised by the relatively scurfy,

crustose thallus, sessile apothecia with a prominent thalline margin, and brown, 2-celled ascospores of the *Pachysporaria*-type, 15–22 × 7–12 µm (Mayrhofer *et al.* 1999).

Strepera Waterfall on Middle River, 35°42'S 137°06'E, 1982, *K. Stove* 1762 (AD); Creek Bay Farm, 35°50'S 138°06'E, 70 m alt., 2013, *G. Kantvilas* 226/13 (HO); W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 499/12 (HO).

Rinodina australiensis Müll.Arg.

Locally common, especially on the bark of *Allocasuarina* and *Melaleuca*, mainly near the coast; also sometimes found on humus-rich soil at the base of these trees. This species has a well-developed, olive-grey, areolate to subsquamulose thallus, conspicuous lecanorine apothecia, and ascospores of the *Mischoblastia*-type [a form with very prominent apical and septal wall thickenings; see, for example, Kaschik (2006)]. As discussed by Mayrhofer *et al.* (1999), *R. australiensis* displays great variation in its ascospore size, to the extent that its subdivision into two infra-specific taxa was considered. Specimens from Kangaroo Island have ascospores that represent the entire size range of 18–33 × 9–16 µm. **Fig. 76C.**

Harveys Return, 35°45'S 136°38'E, 100 m alt., 2010, *G. Kantvilas* 185/10 (HO); Lashmar Lagoon, 35°49'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 264/11, 275/11 *& B. de Villiers* (AD, HO); West Bay, 35°53'S 136°33'E, 10 m alt., 2011, *G. Kantvilas* 301/11 (HO); Murray Lagoon, Timber Creek, 35°55'S 137°26'E, 15 m alt., 2011, *G. Kantvilas* 348/11 *& B. de Villiers* (HO); Pelican Lagoon, 35°49'S 137°48'E, 10 m alt., 2012, *G. Kantvilas* 409/12 *& B. de Villiers* (HO); Ravine des Casoars, 35°48'S 136°35'E, 15 m alt., 2012, *G. Kantvilas* 486/12 *& B. de Villiers* (HO); W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 501/12 (HO); North Cape Road, 35°36'S 137°35'E, 5 m alt., 2013, *G. Kantvilas* 260/13 *& B. de Villiers* (AD, HO).

Rinodina bischoffii (Hepp) A.Massal.

On limestone, mostly in stony paddocks. Characterised by an inconspicuous, mainly endolithic thallus, black apothecia and ascospores of the *Bischoffii*-type (brown, ellipsoid, 1-septate, with a heavily pigmented "waist", 15–21 × 9–13 µm).

Track to Cape Gantheaume, 36°04'S 137°27'E, 2008, *G. Kantvilas* 321/08 *p.p.* (HO); slopes above Red House Bay, 35°49'S 138°07'E, 50 m alt., 2012, *G. Kantvilas* 442/12 (AD, HO); near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 282/13 (HO); Stokes Bay, 35°37'S 137°13'E, 60 m alt., 2013, *G. Kantvilas* 294/13 *& B. de Villiers* (AD, HO).

Rinodina blastidiata Matzer & H.Mayrhofer

Very common on coastal rocks, especially on granite and laterite, where its dark olive-brown, crustose thallus forms a mosaic with orange-coloured *Caloplaca* species, whitish *Tylothallia verrucosa* and the greyish *Xanthoparmelia conranensis*. The ascospores of this species show a range of variation in the course of their development (termed *Teichophila*-type; Kaschik 2006), but pass through a distinctive stage when they are of the *Mischoblastia*-type (Matzer & Mayrhofer 1994).

Point Ellen, 2 km S of Vivonne Bay, 36°00'S 137°11'E, 4 m alt., 1985, *J.A Elix* 19597, 19597a *& L.H. Elix* (CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°47'E, 20 m alt., 1994, *H.T. Lumbsch* 10922k, *A. Dickhäuser & H. Streimann* (CANB); Cape Willoughby, 35°50'S 138°08'E, 2008, *G. Kantvilas* 329/08 (AD, HO); Windmill Bay, 35°51'S 138°07'E, 1 m alt., 2012, *G. Kantvilas* 492/12 (AD, HO).

Rinodina confragosula (Nyl.) Müll.Arg.

In sheltered underhangs on coastal rocks; uncommon (or overlooked). This species has a crustose, areolate to subsquamulose thallus, apothecia that may contain a greenish, N+ red pigment, and ascospores of the *Tunicata*-type (with very rounded lumina and a well-developed torus), 14–25 × 7.5–16 µm (Kaschik 2006).

The old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 338/13 *& B. de Villiers* (HO).

Rinodina confusa H.Mayrhofer & Kantvilas

Recorded from an old *Leucopogon* shrub at the edge of an abandoned paddock. With its olive-grey, subsquamulose thallus, this species is superficially similar to the common *R. australiensis*, but differs from that species by having ascospores with *Physcia*-type (instead of *Mischoblastia*-type) thickenings (Mayrhofer *et al.* 1999).

Hanson Bay Track, c. 1 km S of Grassdale Homestead, 36°00'S 136°52'E, 5 m alt., 2015, *G. Kantvilas* 365/15 *& B. de Villiers* (HO).

Rinodina obscura Müll.Arg.

Recorded from an old, bleached, split eucalypt fencepost in an abandoned paddock. This species is distinguished from other corticolous/lignicolous members of the genus by its inapparent, endophloeodal thallus, apothecia in which the thalline margin is very poorly developed to almost absent, and by the *Physcia*-type ascospores, 16–20 × 6–9 µm (Mayrhofer *et al.* 1999).

Hanson Bay Track, c. 1 km S of Grassdale Homestead, 36°00'S 136°52'E, 5 m alt., 2015, *G. Kantvilas* 361/15 *& B. de Villiers* (HO).

Rinodina oleae Bagl.

On rocks in eucalypt woodland and at the coast, often in sites subject to eutrophication. Characterised by the usually well-developed, pale greyish, rimose-areolate thallus and the *Dirinaria*-type ascospores, 11–18 × 6–11 µm (Kaschik 2006).

Mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°47'E, 20 m alt., 1994, *H.T. Lumbsch* 10922c, *A. Dickhäuser & H. Streimann* (CANB); Penneshaw foreshore near Frenchmans Rock, 35°43'S 137°57'E, 2 m alt., 2013, *G. Kantvilas* 199/13 (HO); Western River Cove, E of beach, 35°41'S 136°58'E, 20 m alt., 2015, *G. Kantvilas* 411/15 (HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2015, *G. Kantvilas* 482/15 (HO).

***Rinodina reagens* Matzer & H.Mayrhofer**
Locally common on coastal limestone outcrops. This species has a thallus of dispersed, rather loosely attached, brownish areoles, numerous, sessile, lecanorine apothecia, and 1-septate, brown ascospores, 18–24 × 13–15 µm. It grows together with the whitish grey species, *Lecanora sphaerospora* and *Buellia albula*.

Cape St Albans, 35°48'S 138°07'E, 20 m alt., 2010, *G. Kantvilas* 172/10 (AD, CANB, HO); same locality, 2012, *G. Kantvilas* 401/12 (AD, HO); Ravine des Casoars, 35°48'S 136°35'E, 10 m alt., 2012, *G. Kantvilas* 457/12 (AD, HO); Stokes Bay, 35°37'S 137°13'E, 60 m alt., 2013, *G. Kantvilas* 295/13 *& B. de Villiers* (HO).

***Rinodina thiomela* (Nyl.) Müll.Arg.**
On sandstone in dry sclerophyll woodland. This species is distinguished from other members of the genus by its pale mustard-yellow thallus. **Fig. 76D.**

Western River, 1972, *R.D. Seppelt* 820C (HO); Mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55083 (AD, CANB); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 752/12 *& B. de Villiers* (AD, HO).

[5]*Rinodina williamsii* H.Mayrhofer
On coastal granite, forming small "islands" amongst the thalli of species of *Xanthoria*, *Caloplaca* and other crustose lichens. It is recognised by the dingy grey-brown, crustose thallus, lecanorine apothecia and *Pachysporaria*-type ascospores, 13–21 × 7.5–11 µm (Kaschik 2006).

Windmill Bay, 35°51'S 138°07'E, 20 m alt., 2012, *G. Kantvilas* 466/12 (AD, HO).

Rinodinella fertilis* (Körb.) Elix var. *fertilis
On coastal rocks. Characterised by a rather lumpy, pale brown to cream thallus containing norstictic and connorstictic acids, black, lecideine apothecia with *Lecanora*-type asci, and thin-walled, pale brown, 1-septate ascospores, 10.5–15 × 5–7 µm.

Stokes Bay, 35°37'S 137°12'E, 2 m alt., 1985, *J.A. Elix* 19661 *p.p. & L.H. Elix* (CANB); Hog Bay, Penneshaw, 35°43'S 137°57'E, 2 m alt., 1985, *J.A. Elix* 19681 *& L.H. Elix* (CANB); W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 503/12 (HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 2 m alt., 2013, *G. Kantvilas* 332/13 *& B. de Villiers* (HO).

[5]*Rinodinella fertilis* var. *hypostictica* (Elix) Elix
In sheltered overhangs on coastal rocks. Morphologically identical to var. *fertilis* from which it differs by containing hypostictic and salazinic acids.

Lesueur Conservation Park, c. 3.5 km SW of Cape Willoughby, 35°51'S 138°06'E, 10 m alt., 2009, *G. Kantvilas* 358/09 (AD, HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 1 m alt., 2012, *G. Kantvilas* 511/12 (HO).

[T]*Sarcogyne meridionalis* P.M.McCarthy & Kantvilas
On limestone boulders and outcrops, mostly in coastal pasture. Characterised by the endolithic to thinly subepilithic thallus, very small, immersed apothecia, <0.4 mm wide, with a dull black, deeply concave, epruinose disc and a usually thin, non-carbonised exciple. Also recorded from mainland South Australia, Flinders Island and the A.C.T. **Illustration:** McCarthy & Kantvilas (2013b: Fig. 2).

Pelican Lagoon, 35°48'S 137°48'E, 20 m alt., 2012, *G. Kantvilas* 413/12 *& B. de Villiers* (HO) [type]; slopes above Red House Bay, 35°49'S 138°07'E, 50 m alt., 2012, *G. Kantvilas* 443/12 (AD, HO); near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 279/13 (AD, HO); Flour Cask Bay, 2013, *A. Wells s.n.* (CANB).

***Sarcogyne* sp.**
On limestone in coastal pasture and gaps in heathland. This unidentified species is characterised by a chiefly endolithic thallus, predominantly immersed, epruinose or occasionally thinly pruinose apothecia, 0.3–0.55 mm wide, with a comparatively thick exciple, c. 60 µm thick. It has also been recorded from mainland South Australia and south-western Western Australia. **Illustration:** McCarthy & Kantvilas (2013b: Fig. 3B).

West Bay, 15 km SSW of Cape Borda, 35°53'S 136°33'E, 40 m alt., 1994, *H. Streimann* 55024 (AD, CANB); near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 278/13 (AD, HO); c. 1.5 km SW of Point Ellen, 36°00'S 137°11'E, 10 m alt., 2015, *G. Kantvilas* 443/15 (HO).

[5]*Schismatomma occultum* (C.Knight & Mitten) Zahlbr.
On twigs in coastal woodland. Characterised by a crustose thallus with a *Trentepohlia* photobiont, irregularly roundish, "lecanoroid" ascomata, *myrticola*-type asci and 3-septate ascospores, 31–38 × 2–3 µm (see Kantvilas 2004). **Fig. 77A.**

Bunker Hill, c. 7 km S of Rocky River Homestead, 36°01'S 136°44'E, 1982, *K. Stove* 1605 *p.p.* (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 779/12 (HO).

[a]*Schismatomma rediunta* (Hasse) Tehler
In dry, sheltered microhabitats on the wood and bark of old dead trees in mallee woodland. This is the first record from the Southern Hemisphere of a species originally described from California. It has the following salient characters: thallus thin to endophloeodal; apothecia adnate to subimmersed, c. 0.5 mm wide, with a grey-pruinose disc and an exfoliating, abraded margin containing algal cells; asci of the *myrticola*-type (after Torrente & Egea 1989); hypothecium reddish brown, KI+ pale violet; ascospores fusiform, 3 (–4)-septate, 17–25 × 4–5.5 µm; conidia bacilliform, curved, 5–6 × 1–1.5 µm. The Kangaroo Island specimens correspond well to the published description of this species (Tehler 1993). **Fig. 77B**

The old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 351/13 *& B. de Villiers* (HO); same locality, 30 m alt., 2015, *G. Kantvilas* 487/15 (AD, HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 346/15 *& B. de Villiers* (AD, HO, UPS).

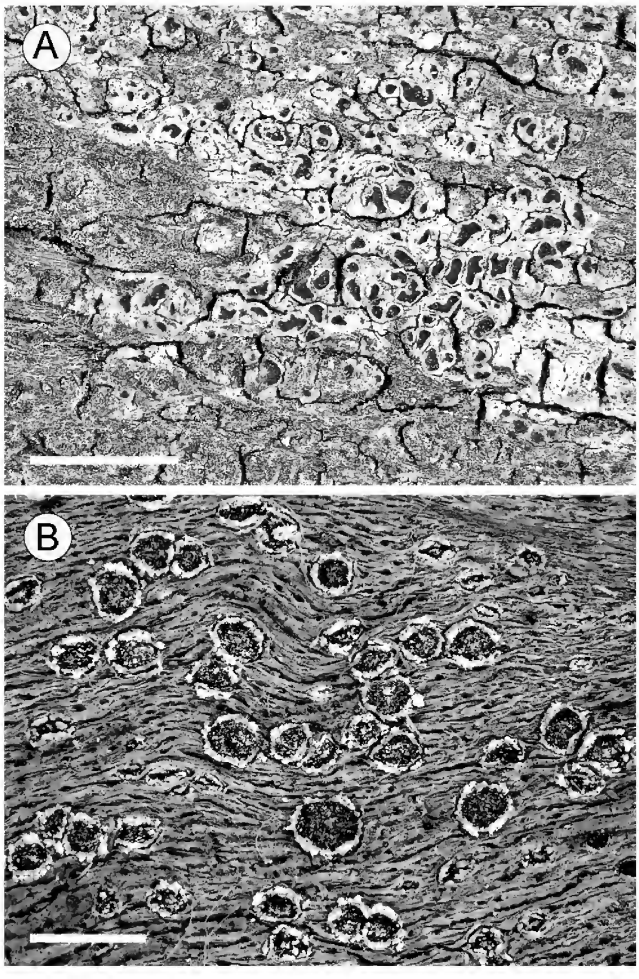

Fig. 77. A *Schismatomma occultum*. **B** *Schismatomma rediunta*. Scales = 1 mm. Photos: J. Jarman.

[5]*Scoliciosporum umbrinum* (Ach.) Arnold

A very inconspicuous species on twigs in mallee woodland. Characterised by a scurfy or granular, greenish thallus and ± immarginate, usually dark apothecia with *Lecanora*-type asci and 3–7-septate, sigmoid-curved ascospores, 20–35 × 2–3 µm (Kantvilas 2008a).

Creek crossing on Amen Corner to Kohinoor Mine Road, 35°41'S 137°13'E, 1982, *K. Stove* 1781 *p.p.* (AD); Mt Taylor Conservation Park, hillside near cave, 35°56'S 137°03'E, 1982, *K. Stove* 1755 *p.p.* (AD, HO).

[5]*Sphinctrina leucopoda* Nyl.

Although not strictly lichenised, this calicioid fungus is frequently listed with lichens on account of its relationships to the superficially similar 'pin lichens'. This species occurs as a parasite on *Ochrolechia insularis*, where it forms tiny black mazaedia on stalks c. 0.3 mm tall (see Tibell 1987 for description).

Cape Willoughby, 35°50'S 138°08'E, 50 m alt., 2008, *G. Kantvilas* 332/08A (HO).

[a]*Strangospora pinicola* (A.Massal.) Körb.

On the bark of *Melaleuca* in old mallee woodland. This is a remarkable first confirmed record for the Southern Hemisphere of a highly inconspicuous, minute species that is rather widespread in temperate areas of the Northern Hemisphere, especially in polluted areas (James *et al.* 2009). It has the following diagnostic characters: thallus scurfy to ± absent or endophloeodal; photobiont a coccoid green alga with ± globose cells 12–17 µm wide; apothecia to 0.3 mm wide, reddish brown, convex, immarginate; hymenium 60–70 µm thick, mostly hyaline but dilute reddish brown in the uppermost part, K± intensifying orange-brown, KI+ blue; hypothecium hyaline to pale brownish; asci broadly clavate, thick-walled, especially at the apex, 45–50 × 18–20 µm, multi-spored (c. 100+), with an intensely amyloid tholus; paraphyses branched and anastomosing, 1.5–2 µm wide with apices not expanded; ascospores globose, hyaline although sometimes a little brownish when old, 3–5 µm diam.; pycnidia not found. The Kangaroo Island collections compare favourably to reference herbarium specimens of this species from Europe, although those tend to have particularly large photobiont cells (to 27 µm wide), their hymenium is less coherent in KOH, and the ascus apex is consequently easier to observe.

Hanson Bay Track, c. 1 km SW of Grassdale Lagoon, 36°00'S 136°52'E, 50 m alt., 2015, *G. Kantvilas* 302/15 *& B. de Villiers* (HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 318/15 *& B. de Villiers* (HO); South West River, 36°01'S 136°52'E, 10 m alt., 2015, *G. Kantvilas* 422/15 (HO).

Teloschistes chrysophthalmus (L.) Th.Fr.

One of Kangaroo Island's most common, widespread and attractive epiphytic lichens, found on twigs in woodland, mallee, heathland and on pasture trees, usually associated with species of *Ramalina*. It is recognised by its bright orange thallus of strap-shaped, ciliate lobes that form button-like clumps 1–2 cm wide, with prominent, ciliate apothecia to c. 5 mm wide. **Fig. 78.**

Near Lockwood Corner, 35°39'S 137°38'E, 1967, *G. Jackson s.n.*, 523 (AD); Old Bullock Track, 35°39'S 137°38'E, 1967, *G. Jackson* 521, 574 (AD); Playford Hwy, 1 km W of Kingscote Airport, 35°43'S 137°31'E, 1985, *J.A. Elix* 19667 *& L.H. Elix* (*J.A. Elix: Lich. Australas. Exsicc.*: 123) (HO); King George Beach, 35°40'S 137°04'E, 2 m alt., 1985, *J.A. Elix* 19757 *& L.H. Elix* (*J.A. Elix: Lich. Australas. Exsicc.*: 124) (HO); 1 km N of Flour Cask Bay, 35°52'S 137°42'E, 1986, *D.N. Kraehenbuehl s.n.* (MEL); adjacent to Eleanor River, 3 km E of Little Sahara sand dunes, 35°57'S 137°17'E, 1989, *D.N. Kraehenbuehl* 5178 (AD); Brown Beach, 35°48'S 137°50'E, 5 m alt., 2007, *R.W. Rogers* 11493 (BRI); The Red Banks, 35°45'S 137°43'E, 2008, *G. Kantvilas* 325/08 (AD, HO); Harveys Return, 35°45'S 136°38'E, 100 m alt., 2010, *G. Kantvilas* 181/10 (AD, HO); Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2010, *G. Kantvilas* 214/10 (AD, HO); North Cape area, 3 km N of Cape Rouge, 35°35'S 137°38'E, 10 m alt., 2013, *G. Kantvilas* 250/13 (HO); Creek Bay Farm, near The Kona, 35°49'S 138°06'E, 70 m alt., 2015, *G. Kantvilas* 505/15 (HO).

Teloschistes spinosus (Hook.f. & Taylor) J.S.Murray

On coastal rocks, forming swards or tufts of entangled, bright orange, sorediate, flattened lobes beset with lateral spinules. It is typically found on the more sheltered faces of large outcrops. **Fig. 79.**

Cape St Albans, 35°48'S 138°07'E, 40 m alt., 2015, *G. Kantvilas* 395/15 (AD, HO); northern end of

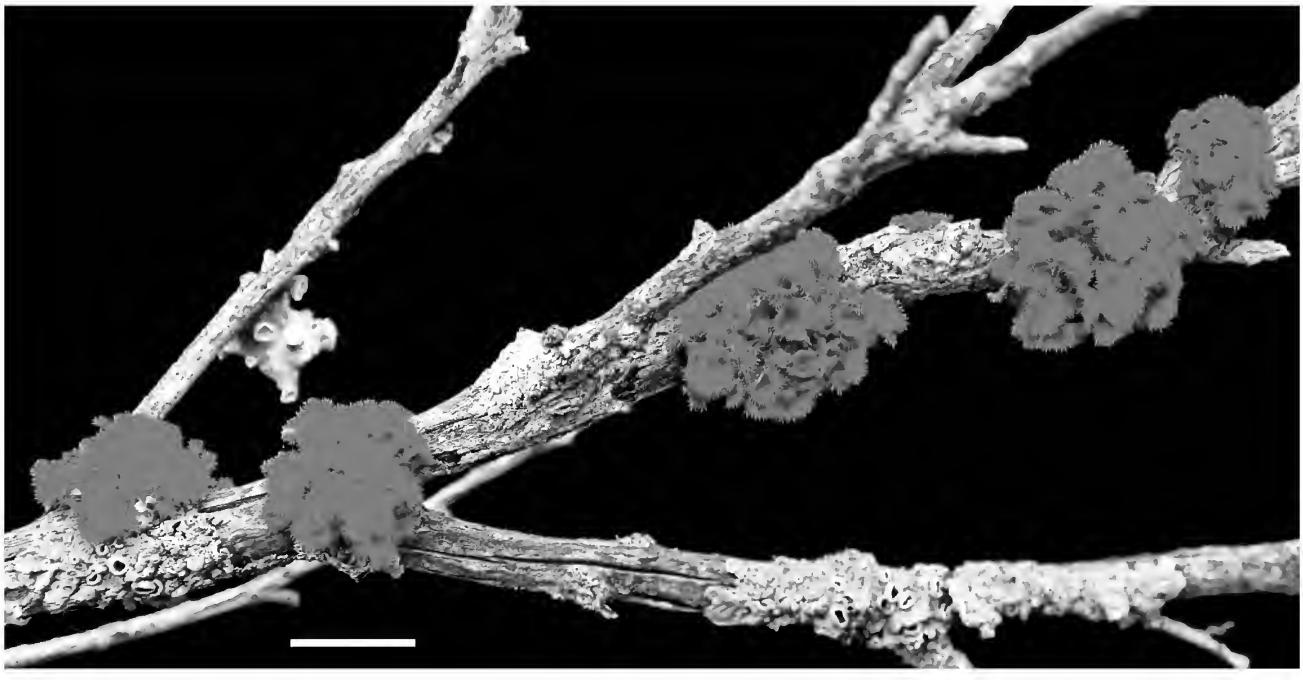

Fig. 78. *Teloschistes chrysophthalmus*. Scale = 10 mm. Photo: J. Jarman.

Antechamber Bay, 35°47'S 138°04'E, 3 m alt., 2015, *G. Kantvilas* 472/15 (HO).

Tephromela alectoronica Kalb

On wood and the bark of understorey trees in dry sclerophyll forest. This species is very similar to the widespread and common *T. atra* (see below), and likewise has a whitish or pale grey crustose thallus, lecanorine apothecia to 1.5 mm wide, with a black, undulate disc, a crimson epihymenium and hymenium, and simple ascospores. It differs chemically by

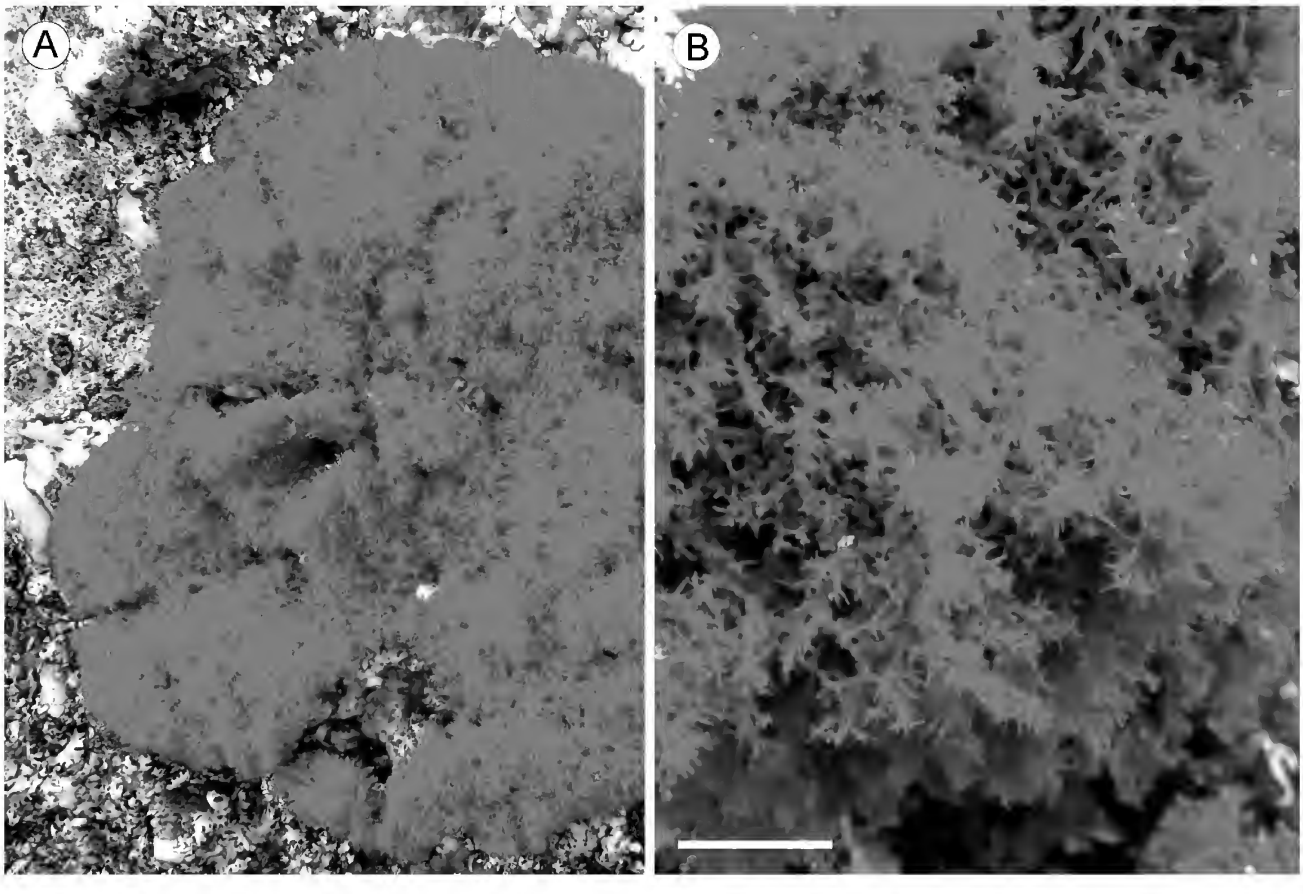

Fig. 79. *Teloschistes spinosus*. **A** Cushion-like habit. **B** Detail. Scale = 5 mm.

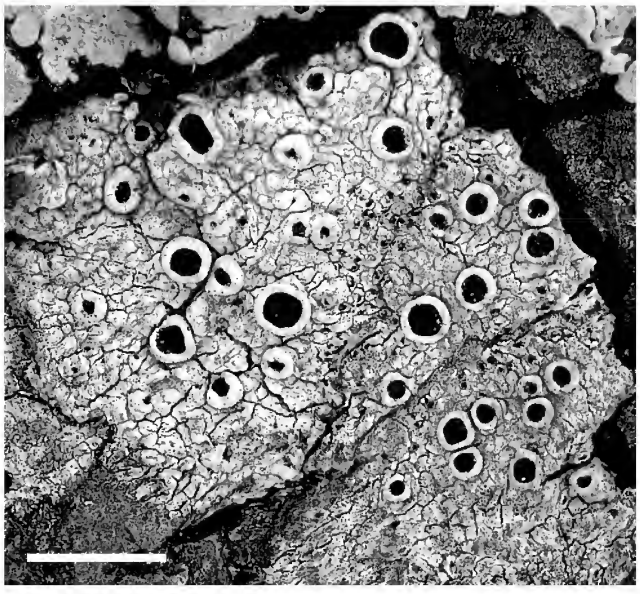

Fig. 80. *Tephromela alectoronica*. Scale = 2 mm. Photo: J. Jarman.

containing atranorin and alectoronic acid; α-collatolic acid is lacking or present in trace concentrations only (Kantvilas 2015). **Fig. 80.**

Mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55127 (AD, CANB, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 574/12 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 359/13 *& B. de Villiers* (AD, HO).

Tephromela atra (Huds.) Hafellner

Widespread and locally abundant in woodland where it grows on bark, wood and rocks. This species is morphologically ± identical to *T. alectoronica* (above), from which it is distinguished chemically by containing atranorin and α-collatolic acid, with or without additional alectoronic and/or bourgeanic acids. The concept of this species applied here essentially follows that of Muggia *et al.* (2013) and includes *T. bullata* Elix, an exclusively corticolous taxon based on a type from Eyre Peninsula, erected by Elix (2012). The status of *T. bullata* is discussed in detail by Kantvilas (2015). **Illustration:** McCarthy (2009: Fig. 4C).

Western River Road, 36 km SE of Cape Borda, 36°03'S 136°44'E, 20 m alt., 1994, *H. Streimann* 54966 [saxicolous] (CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55074 [saxicolous], 55116 (CANB); Red House Bay, 35°49'S 138°06'E, 10 m alt., 2010, *G. Kantvilas* 179/10 (AD, HO); Lashmar Lagoon, 35°48'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 256/11, 269/11 *& B. de Villiers* (AD, HO); Western Cove Road, 35°44'S 137°35'E, 2 m alt., 2011, *G. Kantvilas* 307/11 (AD, HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 418/12 *& B. de Villiers* (AD, HO); Strawbridge Point, 35°47'S 137°47'E, 5 m alt., 2012, *G. Kantvilas* 543/12 *& B. de Villiers* (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 762/12 *& B. de Villiers* (AD, HO) [saxicolous]; Pelican Lagoon Conservation Park, along Mitchell Drive, 35°48'S 137°48'E, 10 m alt., 2015, *G. Kantvilas* 312/15 (HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 536/15 (HO) [saxicolous].

T*Tephromela baudiniana* Kantvilas & Elix

Described from a single collection from coastal rocks on the banks of a fast-flowing, fresh-water stream. Distinguished from the morphologically similar *T. atra* by its unique chemical composition of atranorin, 9-*O*-methylalternariol and alternariol (Kantvilas & Elix 2017). **Fig. 81.**

Rocky River Track, c. 250 m from mouth of river, 35°58'S 136°39'E, 10 m alt., 2015, *G. Kantvilas* 511/15 *& B. de Villiers* (AD, HO) [type].

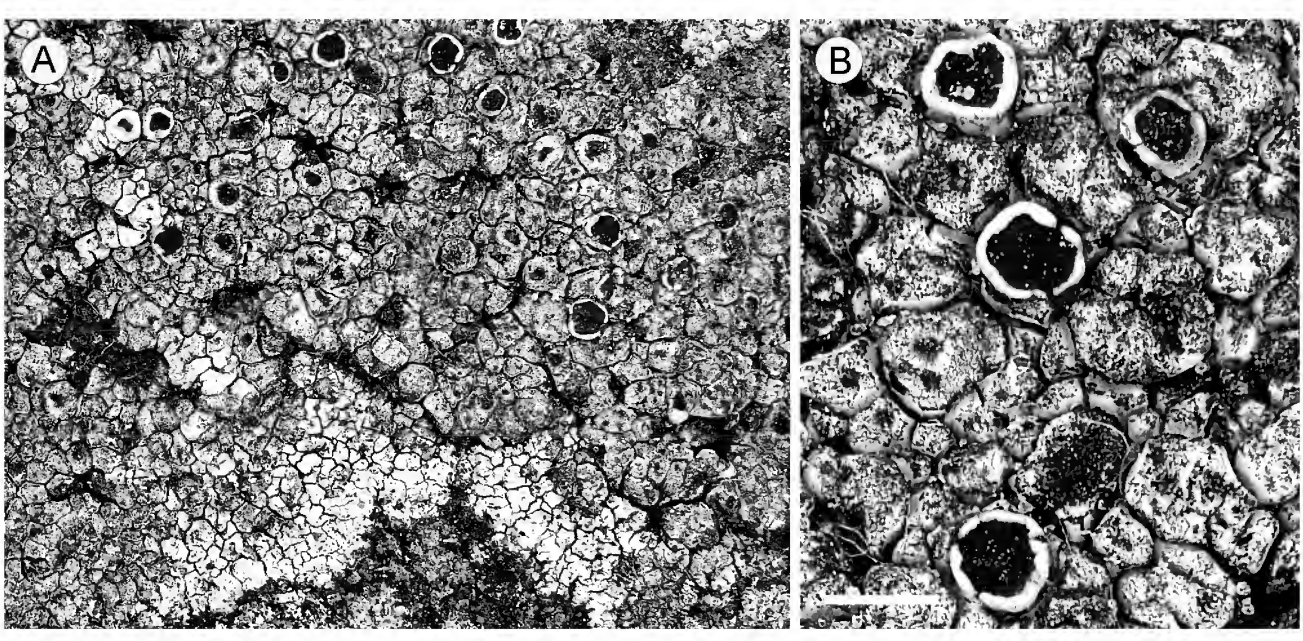

Fig. 81. *Tephromela baudiniana*. **A** Habit. **B** Detail. Scale = 1 mm. Photos: J. Jarman.

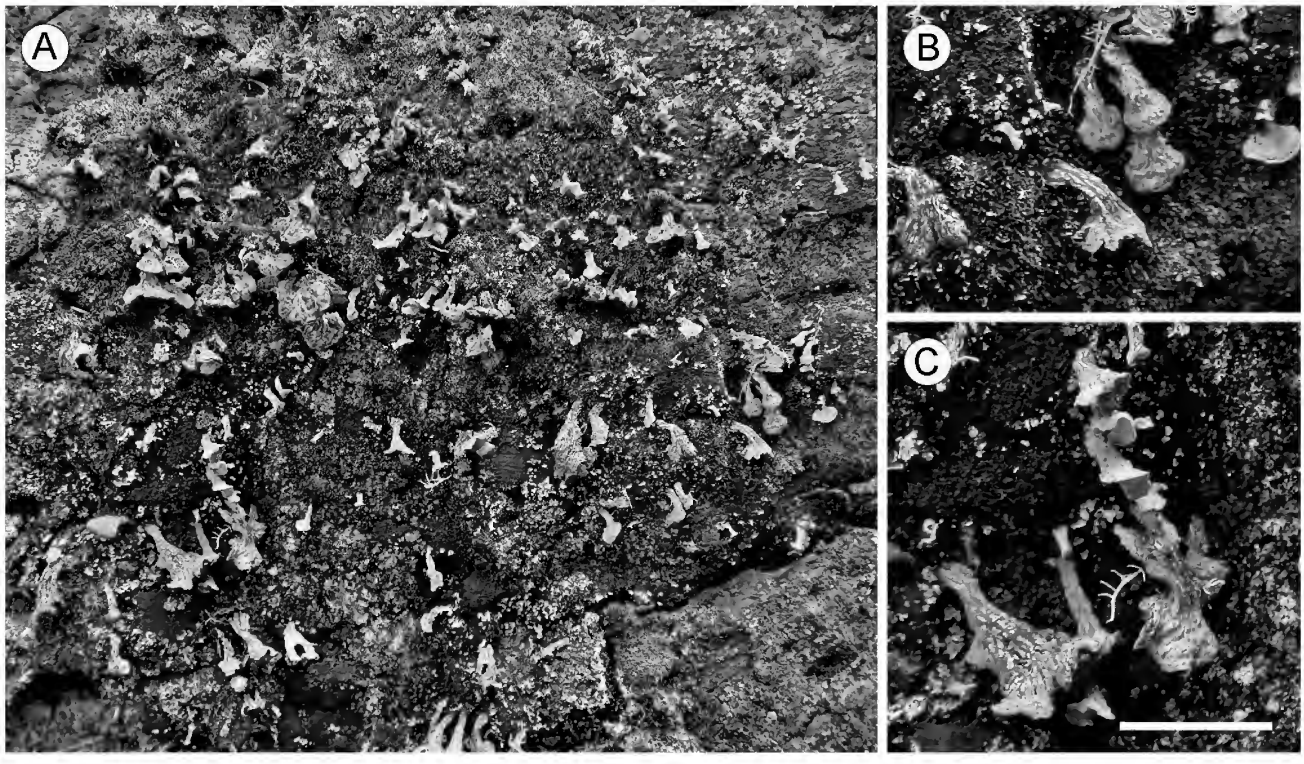

Fig. 82. *Thysanothecium scutellatum*. **A** Habit. **B, C** Detail of pendulous pseudopodetia. Scale = 5 mm. Photos: J. Jarman.

[S]*Tephromela sorediata* Kalb & Elix

On bleached eucalypt wood in dry sclerophyll forest. Although sterile, the Kangaroo Island specimen is readily identifiable by its roundish, grey-green soralia and by the presence of atranorin and alectoronic acid. **Illustration:** Kantvilas (2015: Figs 5–6).

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 590/12 *& B. de Villiers* (AD, HO).

[S]*Thelenella tasmanica* H.Mayrhofer & P.M.McCarthy

On non-calcareous rocks. Characterised by ± immersed perithecia, with non-amyloid, 8-spored asci and muriform ascospores, 22–32 × 10–16 µm (Mayrhofer & McCarthy 1991). In Tasmania, where this species is relatively abundant, it occurs mostly on coastal rocks. The two Kangaroo Island records are from rocks in woodland, albeit adjacent to or near the coast.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 768/12 *& B. de Villiers* (HO); shoreline of Eastern Cove, c. 2.5 km NE of American River, 35°46'S 137°47'E, 3 m alt., 2015, *G. Kantvilas* 492/15 (AD, HO).

[T]*Thelidium robustum* P.M.McCarthy & Kantvilas

On limestone in coastal heathland. Characterised by a pseudosquamulose, greyish green thallus with small, black perithecia and 1-septate ascospores, 16–26 × 9–13 µm. **Illustration:** McCarthy & Kantvilas (2016b: Fig. 1).

Approx. 1.5 km SW of Point Ellen, 36°00'S 137°11'E, 10 m alt., 2015, *G. Kantvilas* 444/15 (HO) [holotype].

Thysanothecium scutellatum (Fr.) D.J.Galloway

On charred or rotting eucalypt lignin in dry sclerophyll forest and mallee woodland. This characteristic Australasian lichen is easily recognised by the yellowish thallus of rather nodulose squamules, from which arise fissured pseudopodetia to c. 15 mm tall, bearing peltate to fan-shaped apothecia. **Fig. 82.**

[Rocky River area], 1940, *J.B. Cleland s.n.* (AD); Rocky River, 1948, *J.B. Cleland s.n.* (AD); Flinders Chase area, 1955, *J.B. Cleland s.n.* (AD); c. 10 km ESE of Western River, 35°46'S 137°01'E, 1972, *R.D. Seppelt* 805 (AD); 30 km ESE of Cape Borda, 35°51'S 136°54'E, 1972, *R.D. Seppelt 890* (AD); Rocky River Koala Sanctuary, 1972, *R.D. Seppelt* 959 (HO); Western River, 35°43'S 136°55'E, 1974, *M. Allender s.n.* (MEL); Ravine des Casoars, 35°48'S 136°37'E, 1982, *K. Stove* 1700 (AD); same locality, 20 m alt., 1985, *J.A. Elix* 19729 *& L.H. Elix* (CANB); c. 1 km E from Rocky River, 35°57'S 136°43'E, 1983, *J.H. Willis s.n.* (MEL); along banks of Middle River, 35°44'S 137°04'E, 1989, *D.N. Kraehenbuehl* 5160 (AD); Cape Hart, 35°54'S 138°03'E, 1997, *R.J. Bates* 48134 (AD); Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 521/12 *& B. de Villiers* (HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 580/12 *& B. de Villiers* (HO); Pelican Lagoon Conservation Park, along Mitchell Drive, 35°48'S 137°48'E, 10 m alt., 2015, *G. Kantvilas* 306/15 (AD, HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 331/15 *& B. de Villiers* (HO); near Kingscote Airport, 35°43'S 137°32'E, 5 m alt., 2015, *G. Kantvilas* 494/15 *& B. de Villiers* (HO).

[S]*Thysanothecium sorediatum* Elix

This species has the stalked, terminal, ± peltate apothecia typical of the genus, but differs from the closely related *T. scutellatum* by having a sorediate basal thallus (Elix 2009b). The single collection is from charred wood.

Between dam on Middle River and Strepera Waterfall, 35°43'S 137°06'E, 1982, *K. Stove* 1775 (AD).

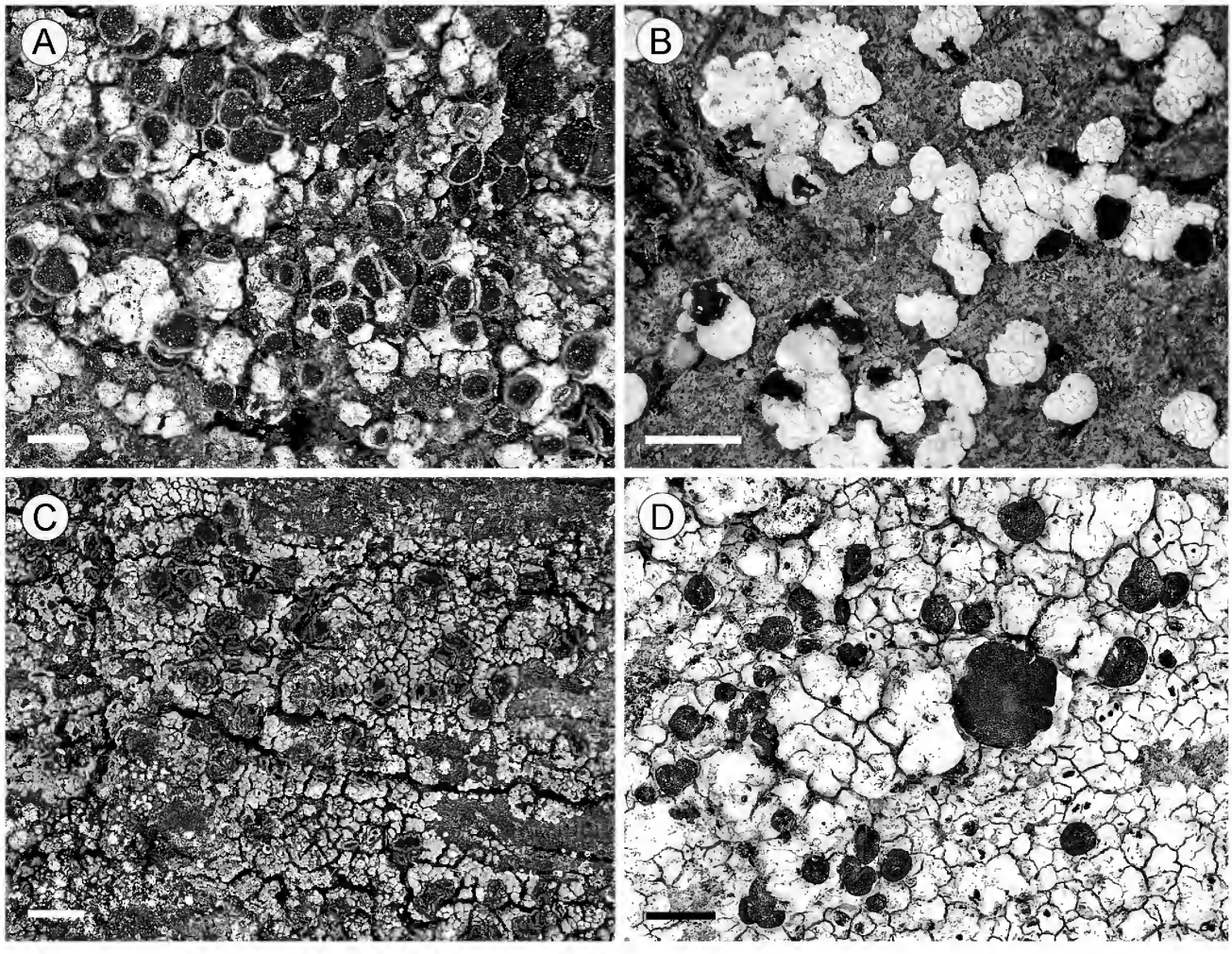

Fig. 83. A *Toninia aromatica*. **B** *Trapelia crystallifera*. **C** *Trapeliopsis flexuosa*. **D** *Tylothallia verrucosa*. Scales = 1 mm. Photos: J. Jarman.

[s]*Toninia aromatica* (Sm.) A.Massal.

Locally common on consolidated soil and soft, weathered limestone in rough pasture, coastal heathland and woodland. Also occasional on rocks in eutrophicated habitats, such as where birds roost. One collection is from an old termite nest. Characterised by the greenish, K– epihymenium and the 3-septate, fusiform ascospores, 12–23 × 4–5.5 µm (Timdal 1991). **Fig. 83A.**

Cape St Albans, 35°48'S 138°07'E, 20 m alt., 2010, *G. Kantvilas* 169/10 (AD, HO); same locality, 10 m alt., 2011, *G. Kantvilas* 356/11 (AD, HO); NW of Pink Bay, 35°50'S 138°07'E, 60 m alt., 2010, *G. Kantvilas* 209/10 (AD, HO); near King George Beach, 35°39'S 137°07'E, 10 m alt., 2011, *G. Kantvilas* 337/11 *& B. de Villiers* (AD, HO); Pelican Lagoon, 35°48'S 137°48'E, 20 m alt., 2012, *G. Kantvilas* 412/12 *& B. de Villiers* (AD, HO); Stokes Bay, 35°37'S 137°13'E, 50 m alt., *G. Kantvilas* 529/12 *& B. de Villiers* (HO); same locality, 60 m alt., 2013, *G. Kantvilas* 296/13 *& B. de Villiers* (AD, HO); Penneshaw foreshore near Frenchmans Rock, 35°43'S 137°57'E, 2 m alt., 2013, *G. Kantvilas* 192/13 (HO); Red House Bay, 35°49'S 138°06'E, 15 m alt., 2013, *G. Kantvilas* 305/13, 309/13 (AD, HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2015, *G. Kantvilas* 475/15 (AD, HO).

Toninia australis Timdal

On consolidated soil and limestone pebbles in coastal heathland. Characterised by the reddish brown, K+ crimson epihymenium and the 1-septate, fusiform ascospores, 10–20 × 3–5 µm (Timdal 1991).

Approx. 1.5 km SW of Point Ellen, 36°00'S 137°11'E, 10 m alt., 2015, *G. Kantvilas* 438/15, 442/15 (AD, HO); Rocky River Track, c. 1 km S of Snake Lagoon, 35°58'S 136°39'E, 50 m alt., 2015, *G. Kantvilas* 510/15 *& B. de Villiers* (AD, HO); Stokes Bay, 35°37'S 137°13'E, 50 m alt., *G. Kantvilas* 522/12 *& B. de Villiers* (AD, HO).

Trapelia coarctata (Sm.) M.Choisy

On consolidated soil and rocks in mallee woodland and dry sclerophyll forest; this species is often one of the first colonisers following fire and other disturbance. Although frequently sterile, it can be recognised by its continuous grey thallus that contains gyrophoric acid (C+ red), and by its *Chlorella*-type photobiont.

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 551/12 *& B. de Villiers* (AD, HO); Beyeria Conservation Park, 35°47'S 137°36'E, 50 m alt., 2013, *G. Kantvilas* 227/13 *& B. de Villiers* (AD, HO); Rocky River Track, 35°57'S 136°40'E, 40 m alt., 2015, *G. Kantvilas* 523/15 (HO).

Trapelia crystallifera Kantvilas & Elix

On consolidated calcareous soil in gaps in coastal woodland. One collection (204/13) is from roadside soil that was clearly imported from another site. **Fig. 83B.**

Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 525/12 *& B. de Villiers* (AD, HO); Chapman River, 35°47'S 138°04'E, 5 m alt., 2013, *G. Kantvilas* 204/13 (AD, HO); Lashmar Conservation Park, c. 2 km S of Cape Coutts, 35°47'S 138°04'E, 50 m alt., 2015, *G. Kantvilas* 432/15 *& B. de Villiers* (HO).

[5]*Trapelia glebulosa* (Sm.) J.R.Laundon

On rocks and consolidated soil. Distinguished from *T. coarctata* chiefly by being composed of discrete or contiguous areoles and small squamules [see Kantvilas & Elix 2007, as *T. involuta* (Taylor) Hertel].

Northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 404/11 (HO); Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 369/13 (AD, HO); Western River Cove, summit of cliffs E of beach, 35°40'S 136°58'E, 50 m alt., 2015, *G. Kantvilas* 400/15 (HO).

[5]*Trapelia thieleana* Kantvilas, Lumbsch & Elix

On loose stones and small outcrops of ironstone in mallee woodland. This species can be distinguished from the superficially similar *T. coarctata* by the distinctive patches of bright yellow pigment on its upper surface (Kantvilas *et al.* 2015). Until recently it was known only from south-western Western Australia, where it grew on a very similar rock type. **Illustration:** Kantvilas *et al.* (2015: Figs 3B, 4).

Kelly Hill Conservation Park, c. 1 km SSW of Kelly Hill Caves, 36°00'S 136°54'E, 40 m alt., 2015, *G. Kantvilas* 432/15 *& B. de Villiers* (AD, HO).

[5]*Trapeliopsis flexuosa* (Fr.) Coppins & P.James

On rotting or bleached dead wood, or occasionally on older living tree trunks in woodland. Often sterile but nevertheless recognised by the grey-green, areolate-crustose thallus containing gyrophoric acid (C+ red); some specimens also have dark green or bluish green soralia. **Fig. 83C.**

Antechamber Bay, near The Kona, 35°49'S 138°05'E, 20 m alt., 2010, *G. Kantvilas* 205/10A (AD, HO); Murray Lagoon, Timber Creek, 35°55'S 137°26'E, 15 m alt., 2011, *G. Kantvilas* 345/11 *& B. de Villiers* (HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 778/12 (AD, HO).

Tylothallia verrucosa (Müll.Arg.) Kantvilas

Very common and widespread, mostly on coastal rocks, where it is largely responsible for the white patches that contrast with the bright orange of *Caloplaca* species and the dull olive-brown hues of *Rinodina blastidiata* and *Catillaria austrolittoralis* (Kantvilas 2014). Less commonly it can be found away from the coast where the thallus becomes discoloured and poorly developed. **Figs 83D, 84.**

Point Ellen, 2 km S of Vivonne Bay, 36°00'S 137°11'E, 4 m alt., 1985, *J.A. Elix* 19594 *& L.H. Elix* (CANB); Hog Bay, Penneshaw, 35°43'S 137°57'E, 2 m alt., 1985, *J.A. Elix* 19680 *& L.H. Elix* (CANB); King George Beach, 35°40'S 137°04'E, 2 m alt., 1985, *J.A. Elix* 19754 *& L.H. Elix* (CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55076 (AD, CANB); Waterfall Creek, 30 km ENE of Cape Borda, 35°42'S 136°54'E, 140 m alt., 1995, *H. Streimann* 54946 (CANB); Rocky River, 24 km SSE of Cape Borda, 35°57'S 136°39'E, 40 m alt., 1994, *H. Streimann* 55029 (CANB); The Kona, Antechamber Bay, 35°47'S 138°05'E, 2008, *G. Kantvilas* 334/08 (AD, HO); W of Windmill Bay, 35°51'S 138°07'E, 40 m alt., 2012, *G. Kantvilas* 504/12 (AD, HO); Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 516/12 *& B. de Villiers* (AD, HO).

[5]*Usnea cornuta* Körb.

Epiphytic in dry sclerophyll forest, *Callitris* forest and in *Melaleuca*-dominated swampy woodland.

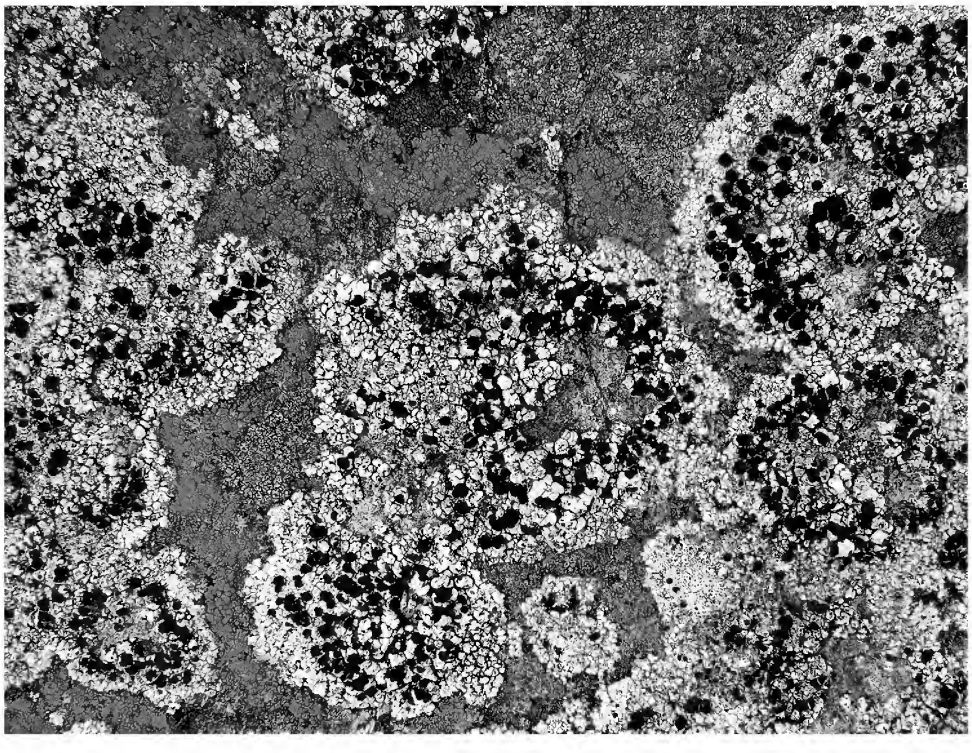

Fig. 84. Coastal rocks, covered in grey thalli of *Tylothallia verrucosa*, associated with the reddish *Caloplaca gallowayi*.

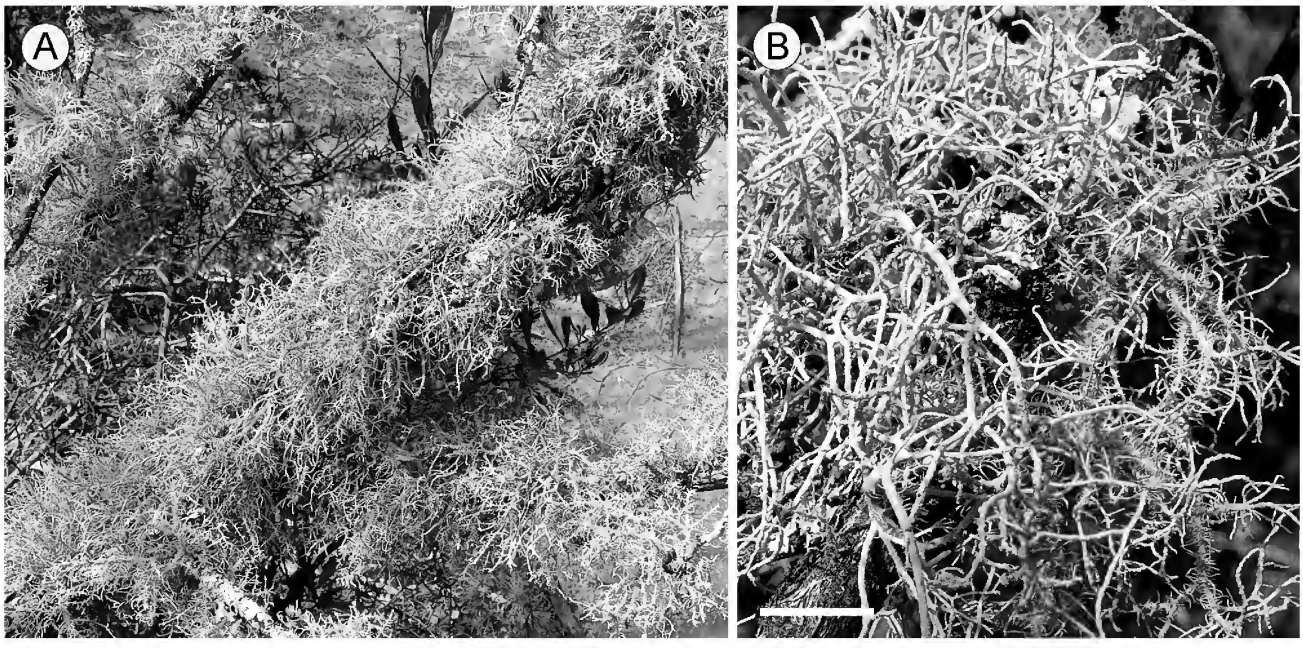

Fig. 85. *Usnea inermis*. **A** general habit. **B** detail of thallus. Scale = 10 mm.

Characterised by a shrubby thallus containing usnic and salazinic acids (often together with scabrosins), usually with very abundant fibrils, rounded soralia and dense isidiomorphs on primary and secondary branches, on the fibrils and in and around the soralia. Identification of *Usnea* species is extremely complex and the interpretation of their highly variable morphology and chemical composition is challenging. Although Australian species were revised by Stevens (2004), I have relied more heavily on the accounts of Ohmura (2001) and Clerc (2004). Species names are applied to Kangaroo Island specimens with considerable caution.

Lashmar Lagoon, 35°49'S 138°04'E, 10 m alt., 2011, *G. Kantvilas* 267/11 *& B. de Villiers* (HO); Murray Lagoon, Timber Creek, 35°55'S 137°26'E, 15 m alt., 2011, *G. Kantvilas* 341/11 *& B. de Villiers* (HO); Brown Beach, 35°48'S 137°50'E, 10 m alt., 2012, *G. Kantvilas* 422/12, 423/12 *& B. de Villiers* (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 578/12, 579/12 *& B. de Villiers* (HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 334/15 (HO).

[5]*Usnea dasaea* Stirt.

Occasional on trees and shrubs in open habitats, especially mallee woodland; very rarely also on rocks. This species is similar to *U. cornuta* and likewise has a subpendulous to shrubby, highly branched thallus, sparse to abundant fibrils, abundant punctiform soralia on the main and secondary branches, and numerous isidiomorphs scattered on the cortex and at the margins of the soralia. The cortex of the main branches has occasional annular cracks. It is distinguished from *U. cornuta* by containing usnic and norstictic acids, sometimes also with salazinic and/or galbinic acids.

Playford Hwy, 1 km W of Kingscote Airport, 35°43'S 137°31'E, 15 m alt., 1985, *J.A. Elix* 19575 *& L.H. Elix* (CANB); 3 km E of Penneshaw, 35°43'S 137°59'E, 1997, *R.J. Bates* 48357 (AD, HO); Red House Bay, 35°49'S 138°06'E, 10 m alt., 2010, *G. Kantvilas* 178/10 (HO); c. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 120 m alt., 2011, *G. Kantvilas* 289/11A *& B. de Villiers* (HO); Lades Road, 35°52'S 137°30'E, 30 m alt., 2011, *G. Kantvilas* 319/11 (HO); Western Cove, 35°44'S 137°35'E, 1 m alt., 2013, *G. Kantvilas* 232/13, 232/13A (HO); Hanson Bay Track, c. 1 km SW of Grassdale Lagoon, 36°00'S 136°52'E, 50 m alt., 2015, *G. Kantvilas* 300/15 *& B. de Villiers* (AD, HO); Grassdale Lagoon, 36°00'S 136°53'E, 20 m alt., 2015, *G. Kantvilas* 335/15 (HO); summit of dunes overlooking Grassdale Lagoon, 36°00'S 136°53'E, 60 m alt., 2015, *G. Kantvilas* 351/15 (AD, HO).

Usnea inermis Motyka

This shrubby, highly variable, epiphytic species is widespread throughout drier areas of Australia. Most Kangaroo Island specimens contain psoromic acid (medulla P+ yellow) but one contains usnic acid only. **Fig. 85.**

N of Murray Lagoon, 35°55'S 137°25'E, 1972, *R.D. Seppelt* 2075 (MEL); corner of Payford Hwy, Birchmore Hwy and road to Kingscote aerodrome, 35°42'S 137°31'E, 1982, *E.N.S. Jackson* 4533 (AD); Rocky River, 4 km W of Rocky River Homestead, 35°57'S 136°42'E, 50 m alt., 1985, *J.A. Elix* 19622 *& L.H. Elix* (CANB); Playford Hwy, 1 km W of Parndana, 35°47'S 137°15'E, 160 m alt., 1985, *J.A. Elix* 19664 *& L.H. Elix* (CANB); West Bay, 15 km SSW of Cape Borda, 35°53'S 136°33'E, 1994, *H.T. Lumbsch* 10916, *A. Dickhäuser & H. Streimann* (CANB); c. 2.5 km SW of Cape St Albans, 35°49'S 138°07'E, 120 m alt., 2011, *G. Kantvilas* 289/11B *& B. de Villiers* (HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 577/12 *& B. de Villiers* (HO); Western Cove, 35°44'S 137°35'E, 1 m alt., 2013, *G. Kantvilas* 232/13B (HO) (usnic acid only); Hanson Bay Track, c. 1 km S of Grassdale Homestead, 36°00'S 136°52'E, 5 m alt., 2015, *G. Kantvilas* 367/15 *& B. de Villiers* (AD, HO).

[5]*Verrucaria alborimosa* P.M.McCarthy & Kantvilas

Recently described from Flinders Island where it grew on coastal limestone (McCarthy & Kantvilas 2015), this species was recorded from deeply shaded crevices on non-calcareous littoral rocks. It can be distinguished from *V. subdiscreta*, the most common species in this habitat on the island, by its larger perithecia and broader ascospores. **Illustration:** McCarthy & Kantvilas (2015: Fig. 1).

Western River Cove, W end of beach, 35°40'S 136°58'E, 2 m alt., 2015, *G. Kantvilas* 417/15 (HO).

Verrucaria buelliicola P.M.McCarthy

On limestone in coastal pasture. The olive-black, areolate thallus forms extensive patches and contrasts with the thick, white thallus of *Buellia albula* on which it grows. Although seemingly not uncommon, it is rarely fertile and hence has been rarely collected. **Illustration:** McCarthy (2003b: Fig. 1).

Cape St Albans, 35°48'S 138°07'E, 20 m alt., 2010, *G. Kantvilas* 168/10 (AD, HO).

Verrucaria calciseda DC.

Widespread on limestone at the coast in pasture, heathland and gaps in woodland. This is perhaps the most common of several endolithic species with tiny, black perithecia sunken in pits in the surface of the substratum; others listed here include *V. muralis* (see below) and *Bagliettoa baldensis* (above). However, additional species, represented by minute fragments and therefore not identifiable with certainty, are also present among collections from the island (P.M. McCarthy, pers. comm.). *Verrucaria calciseda* can be characterised by having perithecia 0.2–0.3 (–0.4) mm wide, lacking an involucrellum and with ascospores 13–24 × 7–13 µm. Contrary to Gueidan *et al.* (2009) who place this species in *Bagliettoa*, I have elected to follow McCarthy (2012) who applies the genus *Verrucaria* in a broader sense.

Windmill Bay, 35°51'S 138°07'E, 10 m alt., 2013, *G. Kantvilas* 236/13 *& B. de Villiers* (AD, HO); near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 280/13, 284/13 (HO); Stokes Bay, 35°37'S 137°13'E, 60 m alt., 2013, *G. Kantvilas* 297/13 *& B. de Villiers* (HO); Red House Bay, 35°49'S 138°06'E, 15 m alt., 2013, *G. Kantvilas* 308/13 (HO).

Verrucaria compacta (A.Massal.) Jatta

On limestone in coastal heathland and pasture. This is a very distinctive species, recognised by its dark olive, subsquamulose thallus with immersed perithecia and subglobose ascospores, 8–13 µm wide.

Near Pelican Lagoon, summit of hill above the Tiger Simpson memorial, 35°50'S 137°49'E, 60 m alt., 2013, *G. Kantvilas* 283/13 (AD, HO); Stokes Bay, 35°37'S 137°13'E, 60 m alt., 2013, *G. Kantvilas* 301/13 *& B. de Villiers* (AD, CANB, HO).

Verrucaria fusconigrescens Nyl.

On boulders in sheltered underhangs, mostly at the edge of dry sclerophyll forest at the coast. This species is recognised by the epilithic, rimose-areolate, brownish thallus, ± superficial, black perithecia, 0.2–0.4 mm wide, with an involucrellum, and by the 16–26 × 7–12 µm ascospores.

Mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55102 *p.p.* (CANB); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 3 m alt., 2013, *G. Kantvilas* 337/13 *& B. de Villiers* (AD, HO).

Verrucaria muralis Ach.

On limestone; recognised by the tiny black perithecia, 0.2–0.5 (–0.6) mm wide, semi-immersed into the surface of the rock, with an involucrellum and ascospores 19–28 × 9–15 µm. **Illustration:** Stenroos *et al.* (2016: 729).

Pelican Lagoon, 35°48'S 137°48'E, 20 m alt., 2012, *G. Kantvilas* 413/12 *p.p. & B. de Villiers* (HO); Flour Cask Bay, 2013, *A. Wells s.n. p.p.* [associated with the parasite *Opegrapha rupestris*] (HO); Stokes Bay, 35°37'S 137°13'E, 60 m alt., 2013, *G. Kantvilas* 293/13 *& B. de Villiers* (HO).

Verrucaria papillosa Ach.

On limestone in coastal heathland. Characterised by an inconspicuous thallus and superficial, black perithecia with a well-developed involucrellum and relatively large ascospores, 23–37 × 14–21 µm.

Approx. 1.5 km SW of Point Ellen, 36°00'S 137°11'E, 10 m alt., 2015, *G. Kantvilas* 445/15 (HO).

Verrucaria subdiscreta P.M.McCarthy

This is the most common littoral species of *Verrucaria* found on the island, occurring on both non-calcareous and calcareous sea-shore rocks, well within the splash zone. The thallus forms extensive black patches, often in sheltered overhangs, with tiny black perithecia, <0.25 mm wide, and relatively small ascospores, 9–15 × 4–6.5 µm. **Fig. 86.**

Emu Bay, 35°35'S 137°31'E, 1957, *H.B.S. Wommersley* (AD); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H.T. Lumbsch* 10922n, *A. Dickhäuser & H. Streimann* (CANB); Ravine

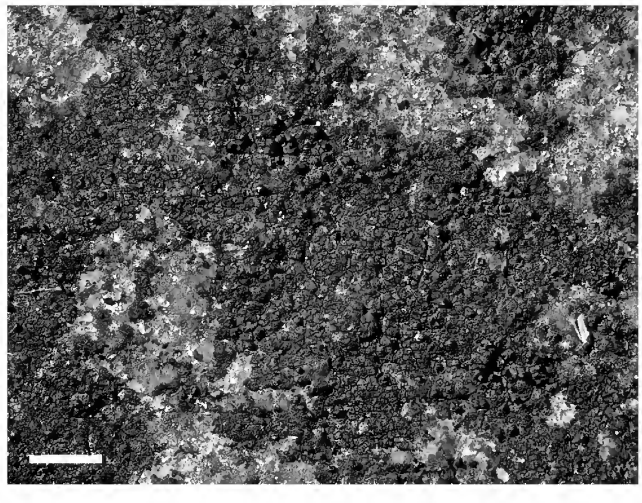

Fig. 86. *Verrucaria subdiscreta*. Scale = 1 mm. Photo: J. Jarman.

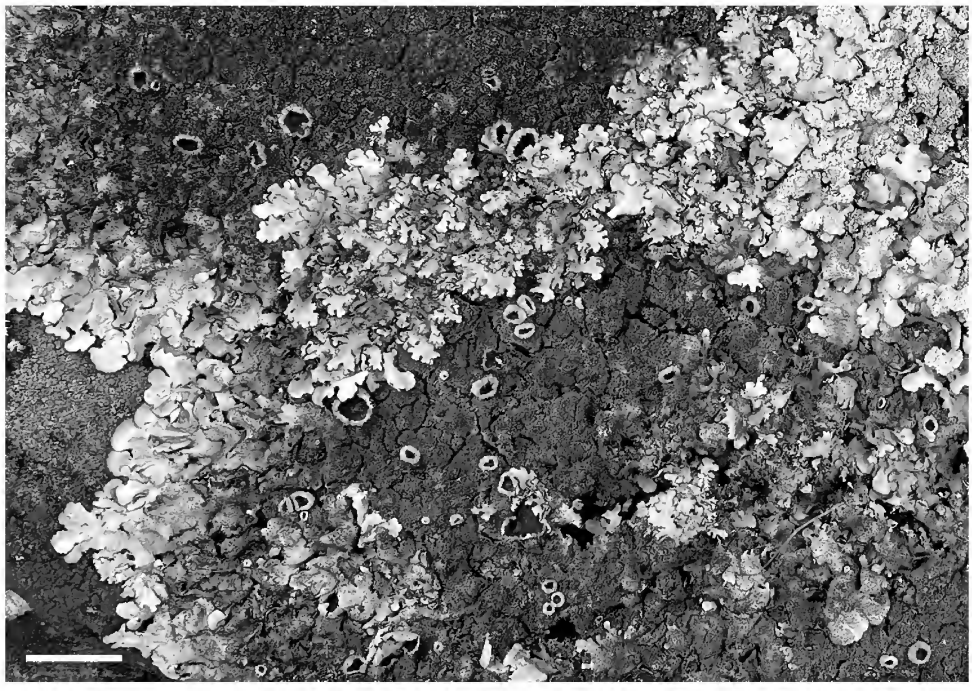

Fig. 87. *Xanthoparmelia australasica*, one of the most common and conspicuous, mat-forming species, especially on coastal rocks. Scale = 10 mm.

des Casoars, 35°48'S 136°35'E, 2 m alt., 2012, *G. Kantvilas* 451/12 (AD, HO); Point Ellen, 36°00'S 137°11'E, 2012, *G. Kantvilas* 465/12 *& B. de Villiers* (AD, HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 2012, *G. Kantvilas* 510/12A (HO); Windmill Bay, 35°51'S 138°07'E, 0 m alt., 2013, *G. Kantvilas* 239/13 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 0.5–1 m alt., 2013, *G. Kantvilas* 324/13, 336/13, 339/13 *& B. de Villiers* (AD, HO); Cape St Albans, 35°48'S 138°07'E, 0 m alt., 2015, *G. Kantvilas* 390/15 (HO).

Verrucaria sp. A

On semi-inundated rocks in a fast-flowing fresh-water stream in dry sclerophyll forest. With its black thallus, minute but prominent perithecia, and 17–22 × 9–12 µm ascospores, this specimen appears to belong to the *V. nigrescens* Pers. complex (P.M. McCarthy, pers. comm.), although *V. nigrescens* in the strict sense is a species that grows mainly on limestone in terrestrial habitats.

Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 541/15 (AD, HO).

Verrucaria sp. B

On rather dry, exposed sandstone in grassy, dry sclerophyll forest. This unusual species is characterised by a very thin, dark grey, effuse thallus with minute, black perithecia, 0.1–0.18 mm wide, and ascospores 16–20 × 7–9 µm.

Lathami Conservation Park, 35°38'S 137°14'E, 160 m alt., 2015, *G. Kantvilas* 296/15 *& B. de Villiers* (HO).

Xanthoparmelia amplexula (Stirt.) Elix & J.Johnst.

On exposed rocks. Characterised by the relatively broad, loosely attached lobes with abundant, slender isidia, a pale to dark brown underside, and by the presence of norlobaridone (medulla KC+ red).

Strepera Falls, 35°42'S, 137°06'E, 1982, *K. Stove* 1761 (AD); Ravine des Casoars, 35°48'S 136°37'E, 20 m alt., 1985, *J.A Elix* 19725 *& L.H. Elix* (CANB); Cygnet River, 41 km WSW of Kingscote, 35°44'S 137°13'E, 110 m alt., 1994, *H. Streimann* 54889 (CANB).

Xanthoparmelia australasica D.J.Galloway

Widely scattered on rocks, especially near the coast. This is the most common of the green *Xanthoparmelia* species found on the island. It forms extensive, loosely attached, ± pure mats of broad, isidiate lobes with a black underside, and contains usnic and salazinic acids. **Fig. 87.**

E of Penneshaw, 35°43'S 137°57'E, 1971, *G. Jackson* 816 (AD); same locality, 1997, *R.J. Bates* 48353B *& W. Bates* (AD); between Cape Hart and Cape Willoughby, 35°53'S 138°05'E, 1982, *K. Stove* 1434 (AD); Stokes Bay, 35°37'S 137°12'E, 2 m alt., 1985, *J.A. Elix* 19656 *& L.H. Elix* (CANB); Hog Bay, Penneshaw, 35°43'S 137°57'E, 2 m alt., 1985, *J.A. Elix* 19673, 19676, 19685 *& L.H. Elix* (CANB); same locality, 15 m alt., 1994, *H. Streimann* 54864 (CANB); W end of Antechamber Bay, 35°48'S 138°05'E, 2 m alt., 1985, *J.A. Elix* 19687, 19688 *& L.H. Elix* (CANB); Harveys Return, 35°45'S 136°38'E, 2 m alt., 1985, *J.A. Elix* 19743, 19747 *& L.H. Elix* (CANB); same locality, 2010, *G. Kantvilas* 182/10 (AD, HO); King George Beach, 35°40'S 137°04'E, 2 m alt., 1985, *J.A. Elix* 19755 *& L.H. Elix* (AD, CANB); Rocky River, 24 km SSE of Cape Borda, 35°58'S 136°39'E, 40 m alt., 1994, *H. Streimann* 55042, 55032 (AD, CANB); mouth of De Mole River, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55106, 55102 (CANB); American River, 35°46'S 137°47'E, 2007, *R.W. Rogers* 11519 (BRI); near Frenchmans Rock, 35°43'S 137°57'E, sea-level, 2007, *R.W. Rogers* 11522 (BRI); Windmill Bay, 35°51'S 138°07'E, 10 m alt., 2011, *G. Kantvilas* 409/11 (AD, HO); Western River Cove, E of beach, 35°41'S 136°58'E, 5 m alt., 2015, *G. Kantvilas* 409/15 (AD, HO).

Xanthoparmelia bratti (Essl.) O.Blanco *et al.*

On foreshore rocks; uncommon. This olive-brown, non-isidiate species with a black underside is a member of the *X. pulla* (Ach.) O. Blanco *et al.* group, closely

related to the common and widespread *X. subprolixa* (see below). It is distinguished by its chemical composition of 4-*O*-methylolivetoric acid (medulla KC+ pink, C–).

Harveys Return, 35°45'S 136°38'E, 2 m alt., 1985, *J.A. Elix* 19742 *& L.H. Elix* (CANB).

Xanthoparmelia cafferensis (Essl.) O.Blanco *et al.*

On exposed rocks; uncommon. This is another olive-brown species and a close relative of *X. subprolixa* (see below), distinguished by its chemical composition of olivetoric acid (medulla KC–, C+ red).

Hog Bay, Penneshaw, 35°43'S 137°57'E, 2 m alt., 1985, *J.A. Elix* 19674 *& L.H. Elix* (CANB); Cape St Albans, 35°48'S 138°07'E, 20 m alt., 2010, *G. Kantvilas* 174/10 *p.p.* (HO); Windmill Bay, 35°51'S 138°07'E, 2 m alt., 2011, *G. Kantvilas* 406/11 (AD, HO).

Xanthoparmelia congensis (J.Steiner) Hale

On exposed rocks. This subcrustose, isidiate species with a black underside is chemically identical to the very common *X. mougeotina* (see below: stictic acid, medulla K+ yellow). It is distinguished by having sparse, inflated to subglobose isidia that become erumpent at the tips, giving the thallus a pustulate appearance.

Murray Lagoon, 23 km SE of Parndana, 35°55'S 137°25'E, 20 m alt., 1985, *J.A. Elix* 19602 *& L.H. Elix* (CANB); Kirkpatrick Point, N of Remarkable Rocks, 36°03'S 136°45'E, 40 m alt., 1985, *J.A. Elix* 19612 *& L.H. Elix* (CANB).

Xanthoparmelia conranensis (Elix) Elix

A very common and widespread foliose lichen on coastal rocks. This species can be very variable in thallus colour, ranging from pale grey to pale beige-brown to brown; its chemistry (atranorin and 4-*O*-methylolivetoric acid: medulla KC+ pink) is diagnostic.

Kirkpatrick Point, N of Remarkable Rocks, 36°03'S 136°45'E, 40 m alt., 1985, *J.A. Elix* 19610, 19611, 19613 *& L.H. Elix* (CANB); Stokes Bay, 35°37'S 137°112'E, 2 m alt., 1985, *J.A. Elix* 19657 *& L.H. Elix* (CANB); Hog Bay, Penneshaw, 35°43'S 137°57'E, 2 m alt., 1985, *J.A. Elix* 19669 *& L.H. Elix* (CANB); Harveys Return, 35°46'S 136°34'E, 2 m alt., 1985, *J.A. Elix* 19744 *& L.H. Elix* (CANB); King George Beach, 35°40'S 137°04'E, 2 m alt., 1985, *J.A. Elix* 19753 *& L.H. Elix* (AD, CANB); Hog Bay, 3 km E of Penneshaw, 35°43'S 137°57'E, 15 m alt., 1994, *H. Streimann* 54869 (CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55088 (CANB); same locality, 1994, *H.T. Lumbsch* 1022h, *A. Dickhäuser & H. Streimann* (CANB); near Frenchmans Rock, 35°43'S 137°57'E, sea-level, 2007, *R.W. Rogers* 11520 (AD, BRI); Cape Willoughby, 35°50'S 138°08'E, 2008, *G. Kantvilas* 330/08 (AD, HO).

Xanthoparmelia delisei (Duby) O.Blanco *et al.*

On rocks. This species is a further member of the *X. pulla* group and is closely related to the common and widespread *X. subprolixa*, and likewise has an olive-brown thallus with a black underside and lacks isidia and soredia. It is characterised by its chemical composition which includes glomelliferic, glomellic and perlatolic acids (medulla K–, C± yellowish or pink, KC+ dull orange, P–, UV–).

Cape St Albans, 35°48'S 138°07'E, 20 m alt., 2010, *G. Kantvilas* 174/10 (AD, HO).

Xanthoparmelia digitiformis (Elix & P.M.Armstr.) Filson

On exposed rocks. Characterised by the non-isidiate lobes with a pale brown underside, and by the presence of salazinic acid as the dominant medullary compound; see Kantvilas *et al.* (2002) for a discussion of this and several other superficially similar species.

Kirkpatrick Point, N of Remarkable Rocks, 36°03'S 136°45'E, 40 m alt., 1985, *J.A. Elix* 19609 & *L.H. Elix* (CANB).

Xanthoparmelia elixii Filson

On rocks in dry sclerophyll forest. Characterised by the non-isidiate thallus with an ivory or pale brown underside, and by the presence of norstictic acid as the dominant medullary compound.

Point Ellen, 36°00'S 137°10'E, 10 m alt., 2007, *R.W. Rogers* 11482 (BRI); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 763/12 *& B. de Villiers* (AD, HO).

Xanthoparmelia exillima (Elix) Elix & J.Johnst.

On exposed rocks. This species is superficially rather similar to the common and widespread *X. mougeotina*, in that both have a tightly adnate, isidiate thallus of narrow lobes. It is distinguished by having a pale underside and by containing norlobaridone (medulla KC+ reddish); in contrast, *X. mougeotina* has a black undersurface and contains stictic acid (medulla K+ yellow).

Scotts Cove Lookout, 3 km E of Cape Borda, 35°46'S 136°37'E, 120 m alt., 1985, *J.A. Elix* 19718 *& L.H. Elix* (CANB); Hog Bay, 3 km E of Penneshaw, 35°43'S 137°57'E, 15 m alt., 1994, *H. Streimann* 54870 (CANB).

Xanthoparmelia filarszkyana (Gyeln.) Hale

Occasional on exposed rocks. With its tightly adnate thallus of broadly rounded, non-isidiate lobes with a pale underside, this species is morphologically similar to the widespread and common *X. metaclystoides*, from which it differs by containing norlobaridone and loxodin (medulla K–, KC+ red).

Middle River, 35°44'S 137°04'E, 1989, *D.N. Kraehenbuehl* 5162 (AD); King George Beach, 35°40'S 137°04'E, 2 m alt., 1985, *J.A. Elix* 19749 *& L.H. Elix* (AD, CANB); Windmill Bay, 35°51'S 138°07'E, 10 m alt., 2011, *G. Kantvilas* 408/11 (AD, HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 529/15 (HO).

Xanthoparmelia flavescentireagens (Gyeln.) D.J.Galloway

On exposed rocks. This is a widespread, common and highly variable species, especially in dry sclerophyll forest. It is characterised by a relatively loosely adnate thallus that lacks isidia, has a pale brown underside and contains norlobaridone (medulla KC+ red). **Fig. 88.**

Eastern side of Smiths Bay, 35°50'S 137°15'E, 1973, *G. Jackson s.n.* (AD); Strepera Falls, 35°42'S, 137°06'E, 1982, *E.N.S. Jackson* 4510 (AD); same locality, 1982, *K. Stove* 1766 (AD); 3 km E of Seal Bay, 36°00'S 137°21'E, 30 m alt., 1985, *J.A. Elix* 19591 *& L.H. Elix* (CANB); Murray Lagoon,

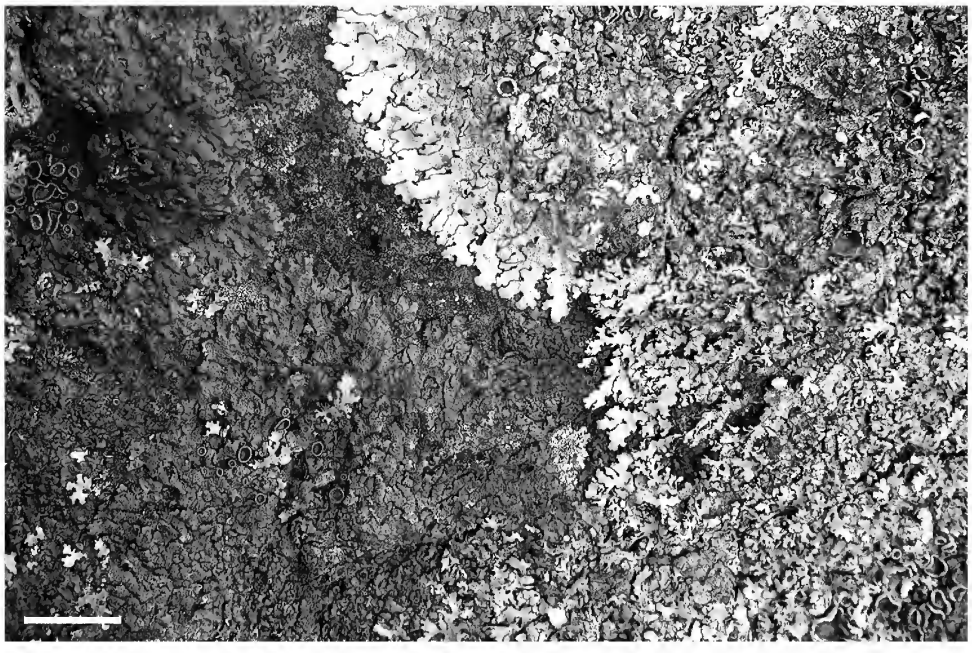

Fig. 88. Current delimitation of the genus *Xanthoparmelia* includes yellow-green species, the traditional concept of the genus, as well as grey ones, previously classified in *Paraparmelia*, and brown ones, previously placed in *Neofuscelia*. Here the green *Xanthoparmelia flavescentireagens* grows together with the grey *X. lithophiloides* and the olive-brown *X. subprolixa*. Scale = 10 mm. Photo: J. Jarman.

23 km SE of Parndana, 35°55'S 137°25'E, 20 m alt., 1985, *J.A. Elix* 19600 *& L.H. Elix* (CANB); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 764/12 *& B. de Villiers* (AD, HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2015, *G. Kantvilas* 474/15 (HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 526/15 (AD, HO).

Xanthoparmelia furcata (Müll.Arg.) Hale

On sandstone in dry sclerophyll forest. This is one of several species that has a loosely adnate thallus of dichotomously branched lobes with ± ascending apices. It is characterised by having a pale brown underside (sometimes blackened at the apices) and by containing norlobaridone (medulla KC+ red). Also present on the island is the superficially similar *X. rubrireagens* (see below).

Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 548/12 *& B. de Villiers* (AD, HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 527/15 (AD, HO).

Xanthoparmelia hybridiza Elix & J.Johnst.

Locally very abundant on seashore cobbles and boulders. Morphologically similar to *X. metaclystoides* and *X. filarszkyana*, this species is characterised chemically by containing medullary barbatic, 4-*O*-demethylbarbatic, norstictic (±), salazinic and consalazinic acids.

Fig. 89. *Xanthoparmelia leucophaea*, a grey species formerly classified in the genus *Paraparmelia*. Scale = 10 mm. Photo: J. Jarman.

King George Beach, 35°40'S 137°04'E, 2 m alt., 1985, *J.A. Elix* 19748 *& L.H. Elix* (AD, CANB); same locality, 1985, *J.A. Elix* 19750 *& L.H. Elix* (MEL); Cape St Albans, 35°48'S 138°07'E, 1 m alt., 2011, *G. Kantvilas* 367/11 (AD, HO).

[5]*Xanthoparmelia leucophaea* (Elix & J.Johnst.) Elix

On rocks in dry sclerophyll forest. This is a grey species, previously included in the genus *Paraparmelia*, characterised by a non-isidiate, loosely attached thallus with a pale to dark brown underside, containing atranorin together with norstictic and salazinic acids. **Fig. 89.**

Ironstone Hills, 35°44'S 137°57'E, 70 m alt., 2015, *G. Kantvilas* 373/15 (HO).

Xanthoparmelia lithophiloides (Kurok.) Elix

Locally common on rocks in dry sclerophyll forest, sometimes forming extensive mats. This grey species is chemically identical to the preceding one but differs chiefly by having a black underside. **Fig. 88.**

Waterfall Creek, 35°42'S 136°54'E, 140 m alt., 1994, *H. Streimann* 54941 (CANB); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 547/12 *& B. de Villiers* (AD, HO); Lathami Conservation Park, 35°38'S 137°14'E, 160 m alt., 2015, *G. Kantvilas* 293/15 *& B. de Villiers* (HO); Ironstone Hills, 35°44'S 137°57'E, 70 m alt., 2015, *G. Kantvilas* 372/15 (HO).

Xanthoparmelia metaclystoides (Kurok. & Filson) Elix & J.Johnst.

On exposed rocks in woodland and rough pasture. Like *X. hybridiza*, *X. filarszkyana*, *X. rimalis* and *X. ustulata*, this species has a tightly adnate, non-isidiate thallus of broad, compact lobes with rounded apices, transverse cracks and a pale brown underside. It is distinguished from these species by containing norstictic acid as the main medullary compound (K+ yellow→red). **Fig. 90.**

E of Wisanger Park Homestead, 35°37'S 137°28'E, 80 m alt., 1985, *J.A. Elix* 19625, 19626 *& L.H. Elix* (CANB); S of Wisanger Park Homestead, 7 km WSW of Emu Bay, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19640, 19643, 19646 *& L.H. Elix* (CANB); c. 2 km SW of Cape St Albans, 35°49'S 138°07'E, 60 m alt., 2011, *G. Kantvilas* 350/11 (HO); c. 3.5 km NE of Stokes Bay, 35°37'S 137°13'E, 50 m alt., 2012, *G. Kantvilas* 534/12 *& B. de Villiers* (AD, HO).

Xanthoparmelia microcephala Elix & Kantvilas

Although usually found on exposed rocks, the single specimen from Kangaroo Island is from a charred eucalypt log in dry sclerophyll woodland. This species is recognised by the elongate, adnate lobes with abundant, cylindrical, branched isidia, the pale brown underside and the presence of salazinic acid as the major medullary compound.

Near Bark Hut Road, 33 km WSW of Kingscote, 35°43'S 137°16'E, 160 m alt., 1994, *H. Streimann* 54875 (CANB).

Xanthoparmelia mougeotina (Nyl.) D.J.Galloway

Common and widespread on exposed rocks in woodland, pasture and near the coast. This species has a small foliose to subcrustose thallus, narrow (<1 mm wide), adnate lobes with a black underside, usually densely crowded, cylindrical isidia, and contains medullary stictic acid (K+ yellow). **Fig. 91.**

Murray Lagoon, 23 km SE of Parndana, 35°55'S 137°25'E, 20 m alt., 1985, *J.A. Elix* 19604 *& L.H. Elix* (CANB); S of Wisanger Park Homestead, 7 km WSW of Emu Bay, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19636, 19641 *& L.H. Elix* (CANB); Ravine des Casoars, 35°48'S 136°37'E, 70 m alt., 1994, *H. Streimann* 54962 (CANB); c. 2 km SW of Cape St Albans, 35°49'S 138°07'E, 60 m alt., 2011, *G. Kantvilas* 351/11 (AD, HO); Windmill Bay, 35°51'S 138°07'E, 10 m alt., 2011, *G. Kantvilas* 410/11 (HO).

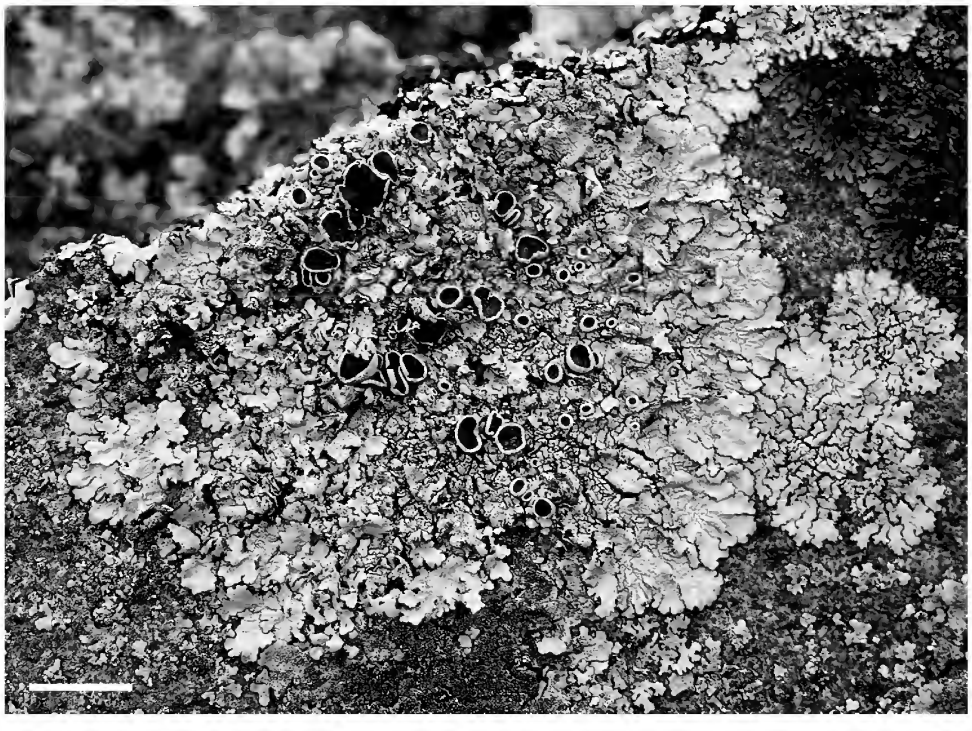

Fig. 90. *Xanthoparmelia metaclystoides*. Scale = 10 mm. Photo: J. Jarman.

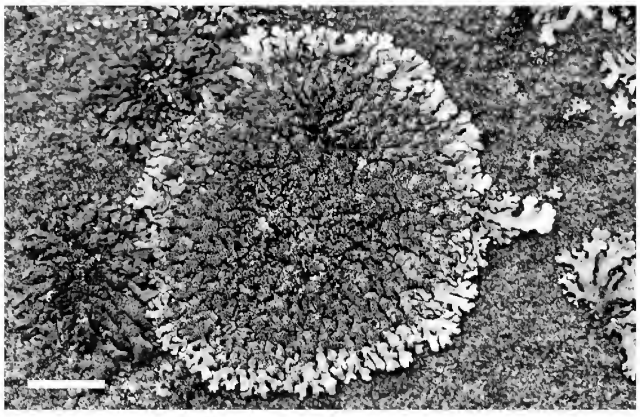

Fig. 91. *Xanthoparmelia mougeotina*. Scale = 5 mm. Photo: J. Jarman.

Xanthoparmelia murina (Kurok.) Elix

On boulders in coastal pasture. This is one of the grey taxa previously included in the genus *Paraparmelia*, characterised by having a black underside and isidia, and by containing salazinic acid as the major medullary constituent.

Cape St Albans, 35°48'S 138°07'E, 20 m alt., 2010, *G. Kantvilas* 175/10 (AD, HO).

Xanthoparmelia neodelisei (Elix) O.Blanco *et al.*

On sandstone boulders in coastal heathland. This is a brown species, superficially similar to members of the *X. subprolixa* group (see below) but distinguished by the pale underside, the pruinose lobe apices and the KC+ fleetingly pink-purple medulla.

Approx. 3.5 km NE of Stokes Bay, 35°37'S 137°13'E, 50 m alt., *G. Kantvilas* 538/12 *& B. de Villiers* (AD, HO).

Xanthoparmelia neorimalis (Elix & P.M.Armstr.) Elix & T.H.Nash

Uncommon, on exposed rocks. Characterised by very tightly adnate, narrow (mostly <0.6 mm), non-isidiate lobes that are imbricate, sometimes subcrustose and transversely cracked in the centre of the thallus but rather separate and linear-elongate at the periphery, the pale brown underside, and the presence of salazininc acid as the main medullary compound.

S of Wisanger Park Homestead, 7 km WSW of Emu Bay, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19645 *& L.H. Elix* (CANB).

Xanthoparmelia neotinctina (Elix) Elix & J.Johnst.

Occasional on exposed rocks, especially in rough pasture. This is a highly variable species, characterised by tightly adnate, broad (>1 mm) lobes with dense, coralloid-cylindrical isidia, a black underside, and containing norstictic acid, often together with salazinic acid (medulla K+ yellow→red). **Fig. 92.**

Rocky River, 24 km SSE of Cape Borda, 35°58'S 136°39'E, 40 m alt., 1994, *H. Streimann* 55031 (CANB); c. 2 km SW of Cape St Albans, 35°49'S 138°07'E, 60 m alt., 2011, *G. Kantvilas* 349/11 (AD, HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 402/11 (AD, HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 532/15 (AD, HO).

Xanthoparmelia nigraoleosa Elix & J.Johnst.

Uncommon on rocks in pasture, growing together with *X. metaclystoides*. This is a tiny, ± subcrustose, non-isidiate species with a black underside, containing fatty acids in the medulla (all spot tests negative).

E of Wisanger Park Homestead, 35°37'S 137°28'E, 80 m alt., 1985, *J.A. Elix* 19628 *& L.H. Elix* (CANB).

Xanthoparmelia parvoclystoides Elix & J.Johnst.

On coastal granite; uncommon. Characterised by the tightly adnate, foliose to subcrustose thallus, lack of isidia, pale brown underside and the presence of norstictic acid as the major medullary compound (K+ yellow→red).

Fig. 92. *Xanthoparmelia neotinctina*. Scale = 10 mm. Photo: J. Jarman.

Kirkpatrick Point, N of Remarkable Rocks, 36°03'S 136°45'E, 40 m alt., 1985, *J.A. Elix* 19608 *& L.H. Elix* (CANB).

Xanthoparmelia pustuliza (Elix) Elix & J.Johnst.

On exposed rocks in dry sclerophyll woodland, often forming extensive colonies. This very distinctive species is characterised by tightly adnate lobes with a black underside, coarse, globular isidia that become erumpent and form granular, soredia-like masses, and by the presence of norstictic acid as the major medullary compound.

Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 528/15, 530/15 (HO).

Xanthoparmelia rimalis (Kurok.) Elix, A.Thell & Søchting

This species is another member of the *X. metaclystoides* group, which on Kangaroo Island also includes *X. hybridiza*, *X. filarszkyana* and *X. ustulata*. It is distinguished from these chemically, by containing salazinic acid as the major medullary compound. It is noteworthy that just like *X. hybridiza*, this species has been recorded on the island exclusively on beach cobbles. In earlier accounts (e.g. Elix 1994), it was referred to under the name *X. lineola* (E.C.Berry) Hale.

King George Beach, 35°40'S 137°04'E, 2 m alt., 1985, *J.A. Elix* 19751 *& L.H. Elix* (CANB).

Xanthoparmelia rubrireagens (Gyeln.) Hale

On exposed rocks in dry sclerophyll woodland. Characterised by the linear-elongate, ± dichotomously branched lobes with ascending apices, and distinguished from *X. furcata* by the presence of salazinic acid as the major medullary compound (K+ yellow→red).

Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 525/15, 530/15 (AD, HO).

Xanthoparmelia scabrosa (Taylor) Hale

On exposed rocks in dry sclerophyll woodland. This highly variable species is recognised by its loosely attached lobes with globular or wart-like isidia that become pustular with age, the pale brown underside, and the presence of norlobaridone (medulla KC+ red).

Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 524/15 (HO).

Xanthoparmelia subloxodella (Elix & Kantvilas) O.Blanco *et al.*

On limestone boulders in coastal sheep pasture. This very distinctive brown species has a pale underside and inflated, eventually erumpent isidia.

North Cape area, 3 km N of Cape Rouge, 35°35'S 137°38'E, 10 m alt., 2013, *G. Kantvilas* 252/13 (AD, HO).

Xanthoparmelia subprolixa (Nyl. ex Kremp.) O.Blanco *et al.*

Widespread and common on rocks in coastal as well as more inland areas; more rarely also on consolidated soil. This is the most common of the olive-brown parmelioid species, formerly included in the genus *Neofuscelia*, characterised by loosely to moderately adnate lobes, a black undersurface, the absence of isidia and soredia, and presence of divaricatic acid as the major medullary compound (medulla K–, KC–, C–, P–, UV–). Several additional, less common species (*X. brattii*, *X. caffarensis* and *X. delisei*) present on the island are morphologically identical but differ by their medullary chemistry. **Figs 88, 93A.**

Kingscote, 1972, collector unknown (MEL); Murray Lagoon, 23 km SE of Parndana, 35°55'S 137°25'E, 20 m alt., 1985, *J.A. Elix* 19601 *& L.H. Elix* (CANB); Kirkpatrick Point, N of Remarkable Rocks, 36°03'S 136°45'E, 40 m alt., 1985, *J.A. Elix* 19607 *& L.H. Elix* (CANB); E of Wisanger Park Homestead, 35°37'S 137°28'E, 80 m alt., 1985, *J.A. Elix* 19627 *& L.H. Elix* (CANB); S of Wisanger Park Homestead, 7 km WSW of Emu Bay, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19637 *& L.H. Elix* (CANB); Scotts Cove Lookout, 3 km E of Cape Borda, 35°46'S 136°37'E, 120 m alt., 1985, *J.A. Elix* 19717, 19722, 19723 *& L.H. Elix* (CANB); King George Beach, 35°40'S 137°04'E, 2 m alt., 1985, *J.A. Elix* 19756 *& L.H. Elix* (CANB); Ballast Head, American River, 35°45'S 137°48'E, 1986, *D.N. Kraehenbuehl s.n.* (MEL); Hog Bay, 3 km E of Penneshaw, 35°43'S 137°56'E, 15 m alt., 1994, *H. Streimann* 54866 (CANB); Ravine des

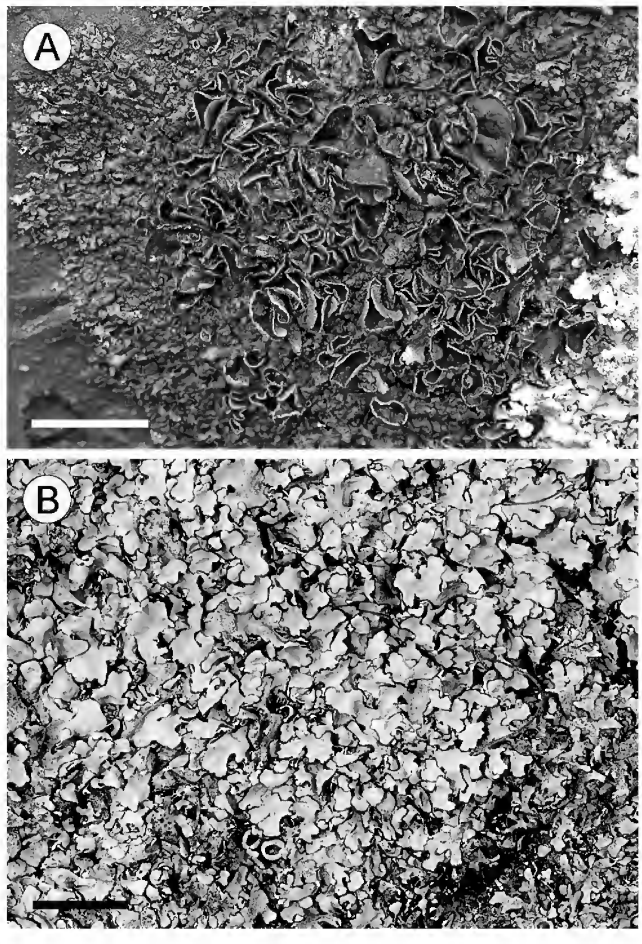

Fig. 93. A *Xanthoparmelia subprolixa*, the most common and widespread of the olive-brown species formerly classified in the genus *Neofuscelia*. It has several, morphologically identical relatives that are distinguished solely by their medullary chemistry. **B** *Xanthoparmelia tasmanica*. Scales = 10 mm. Photos: J. Jarman.

Casoars, 35°48'S 136°37'E, 70 m alt., 1994, *H. Streimann* 54904, 54906, 54960 (CANB); Western River Road, 36 km SE of Cape Borda, 36°03'S 136°44'E, 20 m alt., 1994, *H. Streimann* 54964 (AD, HO); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55066 (AD, CANB); American River, 35°46'S 137°47'E, sea-level, 2007, *R.W. Rogers* 12163 (BRI); near King George Beach, 35°39'S 137°07'E, 2 m alt., 2011, *G. Kantvilas* 329/11 (AD, HO); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 397/11 (AD, HO); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 561/12 *& B. de Villiers* (AD, HO); the old cannery, American River, c. 1 km SW of Ballast Head, 35°46'S 137°48'E, 2 m alt., 2013, *G. Kantvilas* 334/13 *& B. de Villiers* (HO); Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 368/13 (HO); Western River Cove, E of beach, 35°41'S 136°58'E, 5 m alt., 2015, *G. Kantvilas* 410/15 (AD, HO); Lashmar Conservation Park, c. 2 km S of Cape Coutts, 35°47'S 138°04'E, 50 m alt., 2015, *G. Kantvilas* 427/15 *& B. de Villiers* (AD, HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 537/15 (HO).

Xanthoparmelia subverrucella (Essl.) O.Blanco *et al.*

On rocks in rough pasture. Recognised by the foliose, olive-brown thallus containing divaricatic acid, the pale underside and abundant isidia.

Creek Bay Farm at The Kona, 35°49'S 138°05'E, 40 m alt., 2012, *G. Kantvilas* 402/12 (AD, HO).

Xanthoparmelia tasmanica (Hook.f. & Taylor) Hale

Common and widespread on exposed rocks. Together with *X. australasica*, this is the most common of the large, foliose, mat-forming, green *Xanthoparmelia* species present on the island. These two taxa are chemically identical and contain salazinic acid, but *X. tasmanica* lacks isidia. Separation of these species may be tricky as sometimes the isidia on *X. australasica* can be very sparse. **Fig. 93B.**

Hog Bay, 3 km E of Penneshaw, 35°43'S 137°56'E, 15 m alt., 1994, *H. Streimann* 54864A (CANB); Waterfall Creek, 30 km ENE of Cape Borda, 35°42'S 136°54'E, 140 m alt., 1994, *H. Streimann* 54938 (CANB); Rocky River, 35°58'S 136°39'E, 40 m alt., 1994, *H. Streimann* 55049 (CANB); Billygoat Falls, 35°42'S 136°55'E, 200 m alt., 2012, *G. Kantvilas* 546/12 *& B. de Villiers* (AD, HO).

Xanthoparmelia tegeta Elix & J.Johnst.

Occasional on rocks, mostly in dry sclerophyll woodland. Characterised by narrow (<1.5 mm), imbricate, rather linear-elongate lobes that lack isidia, have a black underside and contain stictic acid as the major medullary compound (K+ yellow).

Dudley Peninsula, 35°48'S 137°55'E, 1971, *G. Jackson* 869 (AD); Ravine des Casoars, 35°48'S 136°37'E, 70 m alt. 1994, *H. Streimann* 54958 (CANB); Rocky River, 35°58'S 136°39'E, 40 m alt., 1994, *H. Streimann* 55040 (CANB); mouth of De Mole River, 18 km SSE of Cape Borda, 35°43'S 136°46'E, 20 m alt., 1994, *H. Streimann* 55069, 55092, 55093, 55099 (CANB); Lathami Conservation Park, 35°38'S 137°14'E, 160 m alt., 2015, *G. Kantvilas* 291/15 *& B. de Villiers* (AD, HO); Rocky River, 35°57'S 136°40'E, 35 m alt., 2015, *G. Kantvilas* 531/15 (HO).

Xanthoparmelia ustulata (Kurok. & Filson) Elix & J.Johnst.

An uncommon species of exposed rocks, somewhat resembling the widespread *X. flavescentireagens* and *X. metaclystoides*, from which it differs mainly by its chemical composition. It contains the fatty acids, constipatic and protoconstipatic acids (medulla K–, KC–, P–).

S of Wisanger Hills Homestead, 7 km WSW of Emu Bay, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19638 *& L.H. Elix* (CANB).

Xanthoparmelia verrucella (Essl.) O.Blanco *et al.*

On rocks. This olive-brown foliose lichen was previously included in the genus *Neofuscelia*. It is characterised by the mostly loosely adnate, olive brown to black-brown lobes containing divaricatic acid (medulla K–, KC–, C–, P–, UV–), with a black underside and cylindrical isidia.

Near Bark Hut Road, 35°43'S 137°16'E, 160 m alt., 1994, *H. Streimann* 54881 (AD, CANB); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 398/11 (AD, HO).

T*Xanthoparmelia wisangerensis* Elix & J.Johnst.

This Kangaroo Island endemic species is known only from the type collection, from dry, exposed rocks. It resembles the common *X. metaclystoides* in that it has a yellow-green foliose thallus of tightly adnate, flat lobes to 3 mm wide, a pale undersurface, lacks isidia and contains norstictic and salazinic acids (medulla K+ yellow→red, KC–, C–, P+ yellow); it is distinguished by having subterete laciniae, 0.2–0.5 mm wide, scattered in the centre of the thallus. Attempts to find this species again were unsuccessful as the type locality, on private land in one of the more fertile parts of the island, appears to have been converted to improved pasture.

S of Wisanger Hills Homestead, 7 km WSW of Emu Bay, 35°37'S 137°27'E, 80 m alt., 1985, *J.A. Elix* 19648 *& L.H. Elix* (CANB, MEL) [type].

Xanthoparmelia xanthomelaena (Müll.Arg.) Hale

On exposed rocks. This is a very tightly adnate to subcrustose species, characterised by lacking isidia, having a black underside and containing stictic acid (medulla K+ yellow).

E of Wisanger Park Homestead, 35°37'S 137°28'E, 80 m alt., 1985, *J.A. Elix* 19629 *& L.H. Elix* (CANB); Scotts Cove Lookout, 35°46'S 136°37'E, 120 m alt., 1985, *J.A. Elix* 19719 *& L.H. Elix* (CANB); Creek Bay Farm, 35°50'S 138°06'E, 85 m alt., 2013, *G. Kantvilas* 366/13 (HO).

Xanthoria angustata S.Y.Kondr. & Kärnefelt

On coastal rocks. This species is a relatively recent segregate of *X. ligulata* (see below), from which it differs by having a somewhat deeper reddish orange thallus, with relatively narrow, discrete lobes (0.4–1.2 mm wide) that form a loose, overlapping network through which the substratum is visible (see Kondratyuk *et al.* 2009). It was transferred to the genus *Jackelixia* by Fedorenko *et al.* (2009) and to *Dufourea* by Arup *et*

al. (2013). For discussion of its generic placement, see under *X. ligulata* (below). **Illustration:** Kondratyuk *et al.* (2009: Fig. 31).

Middle River, 35°42'S 137°06'E, *S.J. Edmonds s.n.* (MEL); Stokes Bay, 35°37'S 137°12'E, 2 m alt., 1985, *J.A. Elix* 19654 *& L.H. Elix* (CANB); Point Ellen, 36°00'S 137°10'E, 10 m alt., 2007, *R.W. Rogers* 11484 (BRI, HO); Cape St Albans, 35°48'S 138°08'E, 40 m alt., 2011, *G. Kantvilas* 361/11 (AD, HO, KW); Ravine des Casoars, 35°48'S 136°35'E, 2 m alt., 2012, *G. Kantvilas* 449/12 (AD, HO, KW).

Xanthoria coomae S.Y.Kondr. & Kärnefelt

Widespread and common on wood and bark, especially in areas subject to nutrient enrichment, such as around farms, along roadsides and in gardens. This species is recognised by the typically bright orange-yellow, foliose thallus, with highly congested, plane to concave lobes to 2 mm wide or more, with mostly upturned margins and a pitted and faveolate upper surface. **Fig. 94.**

This species was previously included within the cosmopolitan and highly variable species *Xanthoria parietina* (L.) Beltr. In recent years, this taxon has received considerable attention from taxonomists and, in the Australian region, most collections under this name have been ascribed to newly-described segregate species (Kondratyuk *et al.* 2006, 2007). The name *X. coomae* has since been generally applied to most Australian collections of 'typical' *X. parietina*. However, the relationship between these two taxa remains unclear (Arup *et al.* 2013).

Near Lockwood Corner, Kingscote, 35°39'S 137°38'E, 1967, *G. Jackson* 525 *p.p.* (AD); Playford Hwy, 1 km W of Kingscote Airport, 35°43'S 137°31'E, 15 m alt., 1972, *R.D. Seppelt* 2105 (MEL); same locality, 1985, *J.A. Elix* 19573 *& L.H. Elix* (CANB); c. 4 km W of Rocky River Homestead, 35°57'S 136°42'E, 1982, *K. Stove* 1634 (AD); Creek Bay Farm, headwaters of Lubra Creek, 35°49'S 138°06'E, 40 m alt., 2011, *G. Kantvilas* 387/11 (AD, HO, KW); Hog Bay Road, 35°46'S 137°37'E, 20 m alt., 2013, *G. Kantvilas* 205/13 (AD, HO).

Xanthoria elixii S.Y.Kondr. & Kärnefelt

On bark and wood of coastal trees and shrubs. Like *X. angustata*, this taxon is a segregate of the widespread and variable *X. ligulata* (Kondratyuk *et al.* 2006), with alternative generic placements in *Jackelixia* (Fedorenko *et al.* 2009) or *Dufourea* (Arup *et al.* 2013). In my opinion, the differences between the two species are poorly explained (see Kondratyuk *et al.* 2006), but my interpretation of *X. elixii* is that it is a predominantly corticolous species that differs from *X. ligulata* by having somewhat wider marginal lobes (>1 mm) with slightly upturned margins.

[Rocky River area], 1940, *J.B. Cleland s.n.* (AD); near Lockwood Corner, Kingscote, 35°39'S 137°38'E, 1967, *G. Jackson* 525 *p.p.* (AD); Emu Bay, 1971, *G. Jackson* 821 (AD); Kingscote, old quarry, 35°39'S 137°38'E, 1972, *R.D. Seppelt* 661 (AD); Pelican Lagoon, 35°49'S 137°48'E, 10 m alt., 2011, *G. Kantvilas* 281/11 (AD, HO, KW); Cape St Albans, 35°48'S 138°07'E, 90 m alt., 2011, *G. Kantvilas* 358/11 (HO, KW); Strawbridge Point, 35°47'S 137°47'E, 5 m alt., 2012, *G. Kantvilas* 544/12 *& B. de Villiers* (AD, HO, KW); Point Ellen, 36°00'S 137°11'E, 5 m alt., 2013, *G. Kantvilas* 218/13 (HO); North Cape Road, 35°36'S 137°35'E, 5 m alt., 2013, *G. Kantvilas* 262/13 *& B. de Villiers* (AD, HO).

Xanthoria ligulata (Körb.) P.James

Very common and widespread, mostly on coastal rocks but also on dead wood in coastal situations. Recognised by the typically bright orange-yellow, foliose thallus, with highly congested and imbricate, plane to convex lobes to c. 1 mm wide, downturned and somewhat thickened margins and apices, and a smooth to a little scabrid (but not pitted or faveloate) upper surface. Together with the crustose genus *Caloplaca*, it

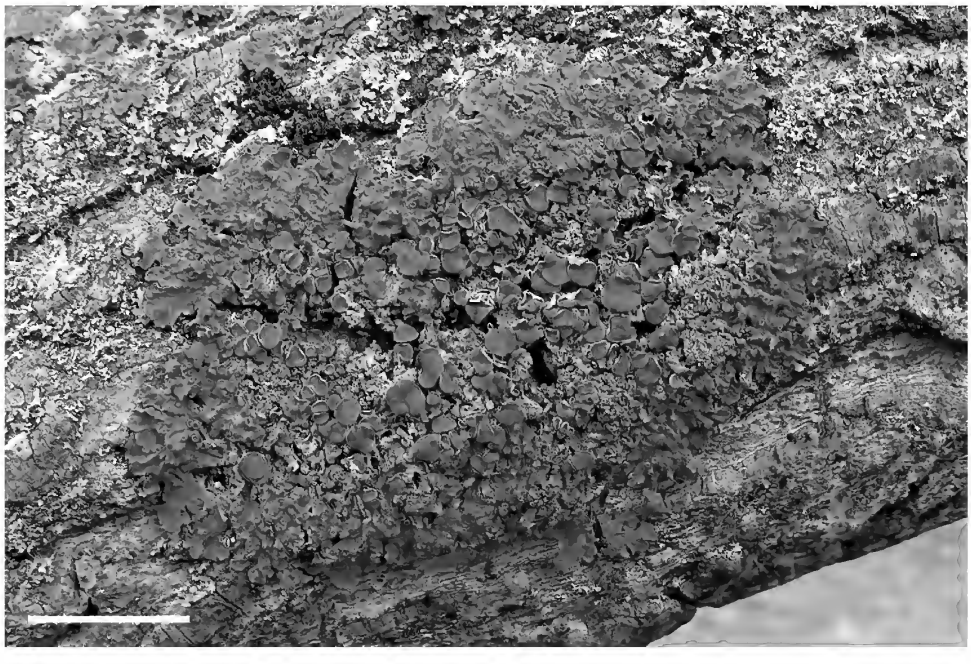

Fig. 94. *Xanthoria coomae*. Scale = 10 mm. Photo: J. Jarman.

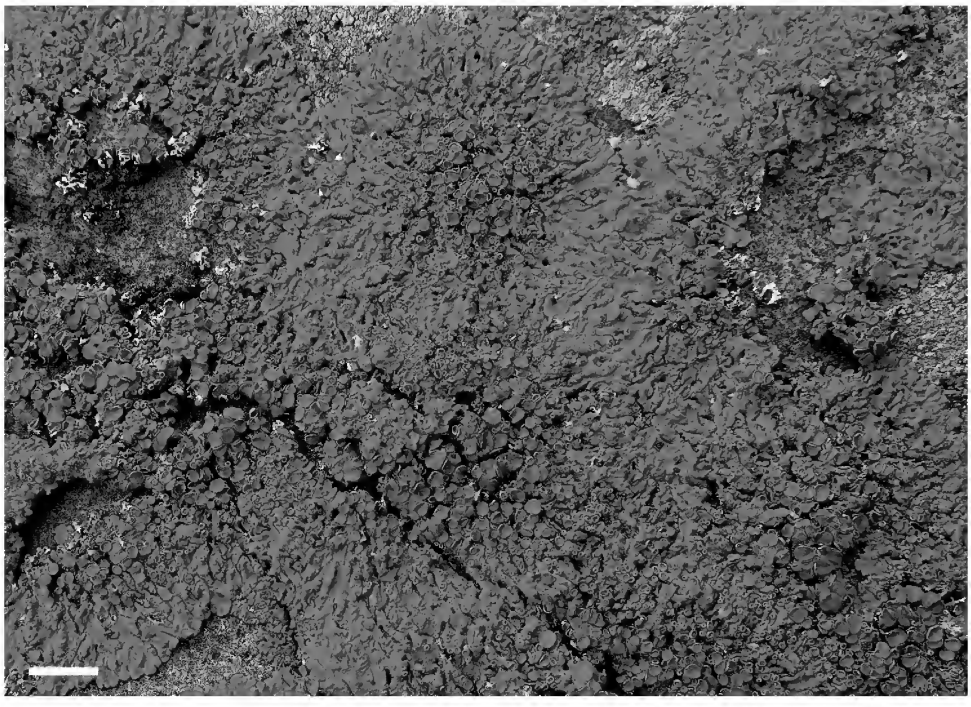

Fig. 95. *Xanthoria ligulata*. Scale = 10 mm.

contributes to the characteristic orange colour of rocky sea-shores. **Fig. 95.**

This is a highly variable species. Depending on the degree of exposure of the habitat, thallus colour ranges from orange-red to yellow-orange, to various shades of greenish or greyish yellow when in deep shade. Lobe width and degree of crowding likewise varies greatly, depending on the habitat. The variability is clearly influenced by the highly dynamic and complex environment in which this species grows, affected by sea spray, fresh-water seepage, nutrification from birds, and exposure to wind, sun and abrasion. In recent years, *X. ligulata* has been segregated into several taxa (Kondratyuk *et al.* 2006, 2007, 2009), of which at least two, *X. angustata* and *X. elixii* (see above), are recorded for the island; a third, undescribed taxon (see below) is also present. Subsequently, *X. ligulata* and its allies have been placed in a separate genus, *Jackelixia*, by Fedorenko *et al.* (2009) and in *Dufourea* by Arup *et al.* (2013), with the former classification being applied in the Australian checklist of McCarthy (2018). However, in my view, until this controversy is resolved and the distinction between the many segregate species is clarified, I prefer to retain a more conservative nomenclature.

American River, 35°47'S 137°26'E, 1966, *M. Fagg* 182 (AD); W face of Mt Stockdale, 35°57'S, 137°04'E, 1971, *G. Jackson*

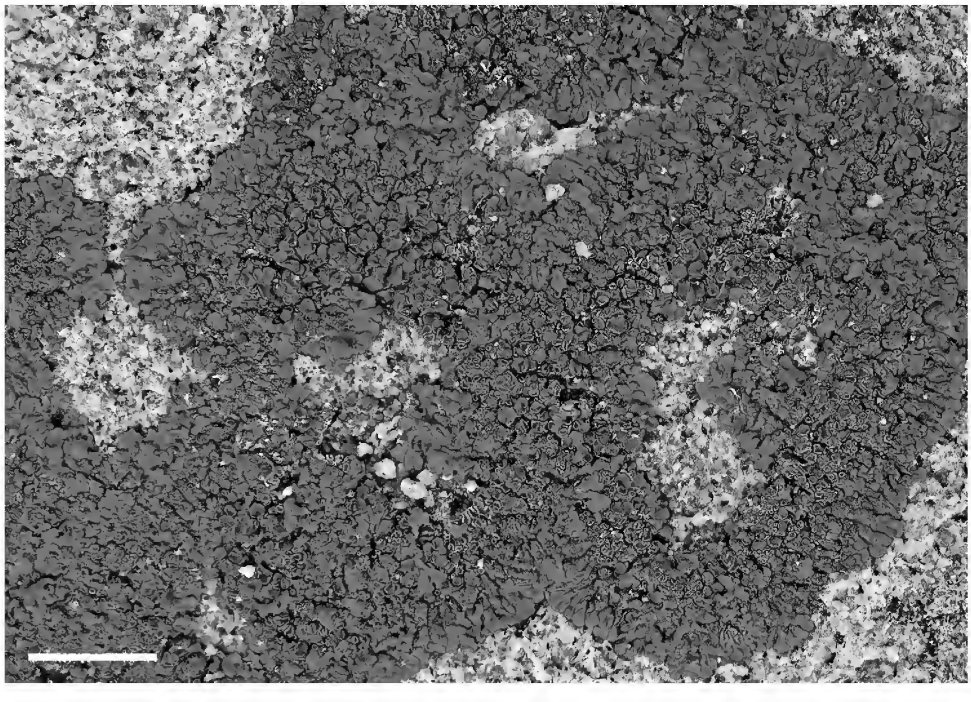

Fig. 96. *Xanthoria* sp., related to the common and widespread *X. ligulata* but distinguished by the broader lobes and somewhat more yellowish hue. These features are best observed when the two species grow together. Scale = 10 mm.

808 (AD); Point Ellen, 36°00'S 137°11'E, 4 m alt., 1985, *J.A. Elix* 19592 *& L.H. Elix* (CANB); Hog Bay, Penneshaw, 35°43'S 137°57'E, 2 m alt., 1985, *J.A. Elix* 19671 *& L.H. Elix* (CANB); Rocky River, 24 km SSE of Cape Borda, 35°57'S 136°39'E, 40 m alt., 1994, *H. Streimann* 55034 (CANB); Hog Bay, 3 km E of Penneshaw, 35°43'S 137°56'E, 15 m alt., 1994, *H. Streimann* 55594 (CANB); E of Penneshaw, 35°43'S 137°57'E, 1997, *R.J. Bates* 48353A *& W. Bates* (AD); Point Ellen, 36°00'S 137°10'E, 2007, *R.W. Rogers* 11481 (BRI); near Frenchmans Rock, Penneshaw, 35°43'S 137°57'E, 2007, *R.W. Rogers* 11485 (BRI); American River, 35°46'S 137°47'E, 2007, *R.W. Rogers* 11487 (BRI); northern end of Antechamber Bay, 35°47'S 138°04'E, 5 m alt., 2011, *G. Kantvilas* 400/11 (AD, HO, KW); Windmill Bay, 35°51'S 138°07'E, 20 m alt., 2012, *G. Kantvilas* 467/12 (HO, KW); Stokes Bay, 35°37'S 137°13'E, 1 m alt., 2012, *G. Kantvilas* 513/12 *& B. de Villiers* (AD, HO, KW).

***Xanthoria* sp.**

On coastal rocks, especially granite, intermixed with *X. ligulata* and species of *Caloplaca*. It differs from the former by having a thallus that is more yellowish and with marginal lobes that are broader (1.5–2 mm), thicker (200–400 µm), crenulate and slightly upturned. The differences between this species and *X. ligulata* are subtle, but when seen growing side-by-side, they are clearly distinct. In gross morphology, it also bears some similarities to the corticolous *X. streimanii* S.Y.Kondr. & Kärnefelt. Like *X. ligulata*, this species belongs to the *Jackelixia*/*Dufourea* group. It has also been collected from Western Australia, the Bass Strait Islands and Tasmania. **Fig. 96.**

Harveys Return, 35°46'S 136°34'E, 2 m alt., 1985, *J.A. Elix* 19745 *& L.H. Elix* (CANB); near Frenchmans Rock, Penneshaw, 35°43'S 137°57'E, 2007, *R.W. Rogers* 11486 (BRI); Point Ellen, 36°00'S 137°11'E, 10 m alt., 2007, *R.W. Rogers* 11483 (BRI, HO); same locality, 2 m alt., 2012, *G. Kantvilas* 459/12 *& B. de Villiers* (AD, HO, KW).

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Tackling such a comprehensive task required much specialist assistance from colleagues. I particularly thank my stalwart and regular collaborators and friends, Jack Elix and Pat McCarthy, for sharing their knowledge of mainland Australian lichens, assisting with their expertise in particular groups, and general encouragement. Other colleagues who assisted with comments on selected specimens, identifications or collaborated on new taxa discovered during the project include Teuvo Ahti, Brian Coppins, Damien Ertz, Alan Fryday, Per Magnus Jørgensen, Kerry Knudsen, Sergey Kondratyuk, Thorsten Lumbsch, Robert Lücking, Matthias Schultz, Anders Tehler, Leif Tibell, Pieter van den Boom and Mats Wedin; I learned much from these friends and collaborators as I slowly came to grips with a flora previously unknown to me.

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Appendix 1. Lichens of Kangaroo Island

[legend: [T] name based on a type from Kangaroo Island; [s] first record for South Australia; [a] first record for Australia]

Acarospora citrina (Taylor) Zahlbr. ex Rech.
[s]*Acarospora veronensis* A.Massal.
[s]*Amandinea decedens* (Nyl.) Blaha & H.Mayrhofer
[T]*Amandinea devilliersiana* Elix & Kantvilas
[T]*Amandinea dudleyensis* Kantvilas & Elix
[T]*Amandinea lignicola* var. *australis* Elix & Kantvilas
[s]*Amandinea litoralis* (Zahlbr.) H.Mayrhofer & Elix
Amandinea neoconglomerata Elix
Amandinea punctata (Hoffm.) Coppins & Scheid.
Amandinea stajsicii Elix & Kantvilas
[T]*Anisomeridium austroaustraliense* P.M.McCarthy & Kantvilas
[s]*Anisomeridium polypori* (Ellis & Everh.) M.E.Barr
[T]*Arthonia caliciae* Kantvilas & Wedin
[s]*Arthonia ilicina* Taylor
[T]*Arthonia insularis* Kantvilas & Wedin
Arthonia intexta Almq.
Arthonia sp. A
Arthonia sp. B
[s]*Aspicilia caesiocinerea* (Nyl. ex Malbr.) Arnold
Aspicilia contorta (Hoffm.) Ach.
[a]*Aspicilia praecrenata* (Nyl.) Hue
Austroparmelina conlabrosa (Hale) A.Crespo, Divakar & Elix
Austroparmelina pruinata (Müll.Arg.) A.Crespo, Divakar & Elix
Austroparmelina pseudorelicina (Jatta) A.Crespo, Divakar & Elix
Austroparmelina subarida (Elix) A.Crespo, Divakar & Elix
[T]*Bacidia brigitteae* Kantvilas
[s]*Bacidia laurocerasi* (Delise ex Duby) Zahlbr.
Bacidia littoralis Kantvilas
Bacidia rubella (Hoffm.) A.Massal. aggr.
Bacidia cf. *schweinitzii* (Fr. ex E.Michener) A.Schneid.
Bacidia septosior (Nyl.) Zahlbr.
[a]*Bacidia stenospora* C.Knight
Bacidia sp. A
Bacidia sp. B
Bacidia sp. C
Baculifera xylophila (Malme) Marbach
Bagliettoa baldensis (A.Massal.) Vězda
[s]*Bryobilimbia australis* (Kantvilas & Messuti) Fryday, Printzen & S.Ekman
Buellia aeruginosa A.Nordin, Owe-Larsson & Elix
Buellia aethalea (Ach.) Th.Fr.
Buellia albula (Nyl.) Müll.Arg.
[s]*Buellia cranfieldii* Elix
Buellia dissa (Stirt.) Zahlbr.
[T]*Buellia extenuatella* Elix & Kantvilas
Buellia halonia (Ach.) Tuck.
Buellia halonioides Elix
Buellia homophylia (C.Knight) Zahlbr.
Buellia stellulata (Taylor) Mudd var. *stellulata*
[T]*Buellia subadjuncta* Elix & Kantvilas
[s]*Buellia subarenaria* Müll.Arg.
Buellia xantholeuca Bungartz & U.Grube
[s]*Byssoloma subdiscordans* (Nyl.) P.James
Calicium abietinum Pers.
[s]*Calicium salicinum* Pers.
Calicium tricolor F.Wilson
[T]*Caloplaca aggregata* [spelling correct?] Kantvilas & S.Y.Kondr.
Caloplaca bastowii S.Y.Kondr. & Kärnefelt
Caloplaca brownlieae S.Y.Kondr., Elix & Kärnefelt
Caloplaca cliffwetmorei S.Y.Kondr. & Kärnefelt
Caloplaca cranfieldii S.Y.Kondr. & Kärnefelt
Caloplaca dahlii Elix, S.Y.Kondr. & Kärnefelt
Caloplaca eos S.Y.Kondr. & Kärnefelt
Caloplaca erythrosticta (Taylor) Zahlbr.
Caloplaca ferdinandmuelleri S.Y.Kondr. & Kärnefelt
Caloplaca gallowayi S.Y.Kondr., Kärnefelt & Filson
[T]*Caloplaca gilfillaniorum* Kantvilas & S.Y.Kondr.
Caloplaca holocarpa (Hoffm.) A.E.Wade
Caloplaca jackelixii S.Y.Kondr., Kärnefelt & A.Thell
Caloplaca jerramungupensis S.Y.Kondr., Kärnefelt & Elix
Caloplaca johnwhinrayi S.Y.Kondr. & Kärnefelt
Caloplaca kaernefeltii S.Y.Kondr., Elix & A.Thell
Caloplaca kalbiorum S.Y.Kondr. & Kärnefelt
Caloplaca kantvilasii S.Y.Kondr. & Kärnefelt
Caloplaca kilcundaensis S.Y.Kondr. & Kärnefelt
Caloplaca lateritia (Taylor) Zahlbr.
Caloplaca maccarthyi S.Y.Kondr., Kärnefelt & Elix
Caloplaca mereschkowskiana S.Y.Kondr. & Kärnefelt
Caloplaca montisfracti S.Y.Kondr. & Kärnefelt
[T]*Caloplaca piscatorica* Kantvilas & S.Y.Kondr.
Caloplaca rexfilsonii S.Y.Kondr. & Kärnefelt
[T]*Caloplaca sergeyana* Kantvilas
Caloplaca sublobulata (Nyl.) Zahlbr.
Caloplaca subluteoalba S.Y.Kondr. & Kärnefelt
Caloplaca tibellii S.Y.Kondr. & Kärnefelt
Caloplaca tomareeana S.Y.Kondr. & Kärnefelt
Caloplaca wilsonii S.Y.Kondr. & Kärnefelt
Caloplaca yorkensis S.Y.Kondr. & Kärnefelt
Candelariella aurella (Hoffm.) Zahlbr.
Candelariella vitellina (Hoffm.) Müll.Arg.
Candelariella xanthostigmoides (Müll.Arg.) R.W.Rogers
Carbonea latypizodes (Nyl.) Knoph & Rambold
Carbonicola foveata (Timdal) Bendiksby & Timdal
[T]*Catillaria austrolittoralis* Kantvilas & van den Boom
[a]*Catillaria nigroclavata* (Nyl.) Schuler
[s]*Catinaria atropurpurea* (Schaer.) Vězda & Poelt
Chrysothrix xanthina (Vain.) Kalb
Cladia aggregata (Sw.) Nyl.

Cladia ferdinandii (Müll.Arg.) Filson
Cladia schizopora (Nyl.) Nyl.
Cladonia capitellata var. *squamatica* A.W.Archer
Cladonia enantia Nyl. var. *enantia*
Cladonia humilis (With.) J.R.Laundon
[s]*Cladonia macilenta* Hoffm.
Cladonia neozelandica var. *striata* (A.W.Archer) Kantvilas
Cladonia neozelandica var. *sulcata* (A.W.Archer) Kantvilas
[s]*Cladonia ochrochlora* Flörke
Cladonia praetermissa A.W.Archer var. *praetermissa*
Cladonia rigida var. *acuta* (Taylor) A.W.Archer
[s]*Cladonia subradiata* (Vainio) Sanstede
Cladonia verticillata (Hoffm.) Schaer.
[a]*Clauzadea metzleri* Clauzade & Cl.Roux ex D.Hawksw.
[s]*Cliostomum griffithii* (Sm.) Coppins
Coenogonium australiense Kantvilas & Lücking
Collema coccophorum Tuck.
Collema glaucophthalmum Nyl. var. *glaucophthalmum*
Collema glaucophthalmum var. *implicatum* (Nyl.) Degel.
Collema subflaccidum Degel.
Collemopsidium sp.
[s]*Cyphelium trachylioides* (Nyl.) Erichsen ex Keissl.
Diploicia canescens (Dicks.) A.Massal.
[s]*Diploschistes gyrophoricus* Lumbsch & Elix
Diploschistes muscorum (Scop.) R.Sant. subsp. *bartletti* Lumbsch
Diploschistes thunbergianus Lumbsch & Vězda
Diplotomma alboatrum (Hoffm.) Flot.
Endocarpon simplicatum (Nyl.) Nyl. var. *simplicatum*
Endocarpon simplicatum var. *bisporum* P.M.McCarthy
[s]*Enterographa divergens* (Müll.Arg.) Redinger
[a]*Ephebe ocellata* Henssen
Fellhanera sp.
Flavoparmelia haysomii (C.W.Dodge) Hale
Flavoparmelia rutidota (Hook.f. & Taylor) Hale
Flavoparmelia soredians (Nyl.) Hale
Flavoparmelia springtonensis (Elix) Hale
Fuscopannaria decipiens (P.M.Jørg. & D.J.Galloway) P.M.Jørg.
[s]*Fuscopannaria minor* (Darb.) P.M.Jørg.
Glonium sp.
Gyalolechia cranfieldii (S.Y.Kondr. & Kärnefelt) Søchting, Frödén & Arup
[a]*Halecania spodomela* (Nyl.) M.Mayrhofer
Halecania subsquamosa (Müll.Arg.) van den Boom & H.Mayrhofer
[s]*Hertelidea aspera* (Müll.Arg.) Kantvilas & Elix
Hertelidea pseudobotryosa R.C.Harris, Ladd & Printzen
Heterodermia hybocarponica Elix
Heterodermia obscurata (Nyl.) Trevis.
Heterodermia tremulans (Müll.Arg.) W.L.Culb.
Heteroplacidium contumescens (Nyl.) Breuss
[s]*Hymenelia lacustris* (With.) M.Choisy
Hyperphyscia adglutinata (Flörke) H.Mayrhofer & Poelt
Hypocenomyce australis Timdal
Hypotrachyna revoluta (Flörke) Hale
[s]*Japewiella pruinosula* (Müll.Arg.) Kantvilas
Lecania cyrtella (Ach.) Th.Fr.
Lecania inundata (Hepp ex Körb.) M.Mayrhofer
[a]*Lecania koerberiana* Lahm
[T]*Lecania maritima* Kantvilas & van den Boom
Lecania polycarpa (Müll.Arg.) Kantvilas & van den Boom
Lecania turicensis (Hepp) Müll.Arg.
Lecanora andina Räsänen
Lecanora caesiorubella Ach.
[s]*Lecanora casuarinophila* Lumbsch
Lecanora crenulata (Dicks.) Hook.
Lecanora dispersa (Pers.) Sommerf.
Lecanora elapheia Stizenb.
Lecanora farinacea Fée
Lecanora flavidomarginata B. de Lesd.
[s]*Lecanora flavopallida* Stirt.
Lecanora galactiniza Nyl.
[s]*Lecanora helva* Stizenb.
[s]*Lecanora mobergiana* Lumbsch & Elix
Lecanora pseudistera Nyl.
Lecanora saligna (Schrad.) Zahlbr.
Lecanora sphaerospora Müll.Arg.
[s]*Lecanora subtecta* (Stirt.) Kantvilas & LaGreca
Lecanora symmicta (Ach.) Ach.
Lecidea capensis Zahlbr.
Lecidea fuscoatrula Nyl.
Lecidea ochroleuca Pers.
Lecidea sarcogynoides Körb.
Lecidea terrena Nyl.
Lecidella destituta Kantvilas & Elix
Lecidella enteroleucella (Nyl.) Hertel
Lecidella flavovirens Kantvilas & Elix
Lecidella granulosula (Nyl.) Knoph & Leuckert var. *granulosula*
[T]*Lecidella granulosula* var. *lecanorina* Kantvilas & Elix
[T]*Lecidella leucomarginata* Kantvilas & Elix
Lecidella sublapicida (C.Knight) Hertel
Lecidella xylogena (Müll.Arg.) Kantvilas & Elix
[s]*Leimonis erratica* (Körb.) R.C.Harris & Lendemer
Lepra erubescens (Hook.f. & Taylor) A.W.Archer & Elix
[s]*Lepra leucosorodes* (Nyl.) I.Schmitt, Hodkinson & Lumbsch
[s]*Lepra subventosa* (Malme) I.Schmitt & Lumbsch var. *subventosa*
Lepraria coriensis (Hue) Sipman
Lepraria finkii (B. de Lesd.) R.C.Harris
Leptogium aff. *biatorinum* (Nyl.) Leight.
[s]*Leptogium crispatellum* Nyl.
[s]*Leptogium pecten* F.Wilson
[a]*Leptogium schraderi* (Bernh.) Nyl.
Lichina intermedia (C.Bab.) M.Schultz
Megalaria grossa (Pers. ex Nyl.) Hafellner

[s]*Megalaria laureri* (Th.Fr.) Hafellner
[s]*Megalaria subtasmanica* Kantvilas
Menegazzia caesiopruinosa P.James
[a]*Metamelanea melambola* (Tuck.) Henssen
[s]*Micarea denigrata* (Fr.) Hedl.
[a]*Micarea globulosella* (Nyl.) Coppins
[T]*Micarea kartana* Kantvilas & Coppins
[s]*Micarea melaneida* (Nyl.) Coppins
[s]*Micarea micrococca* (Körb.) Gams ex Coppins aggr.
[s]*Monerolechia badia* (Fr.) Kalb
[s]*Mycocalicium victoriae* (C.Knight ex F.Wilson) Nádv.
[s]*Notocladonia cochleata* (Müll.Arg) S.Hammer
Notoparmelia erumpens (Kurok.) A.Crespo, Ferencova & Divakar
Ochrolechia africana Vain.
[s]*Ochrolechia gyrophorica* (A.W.Archer) A.W.Archer & Lumbsch
[T]*Ochrolechia insularis* Kantvilas & Elix
[s]*Opegrapha atra* Pers.
[a]*Opegrapha dolomitica* (Arnold) Clauzade & Cl.Roux
[a]*Opegrapha niveoatra* (Borrer) Laundon
[a]*Opegrapha rupestris* Pers.
[a]*Opegrapha spodopolia* Nyl.
[s]*Opegrapha varia* Ach. *sens. lat.*
Pannaria obscura Müll.Arg.
Paraporpidia glauca (Taylor) Rambold
Paraporpidia leptocarpa (C.Bab. & Mitt.) Rambold & Hertel
[s]*Parmotrema cetratum* (Ach.) Hale
[s]*Parmotrema cooperi* (J.Steiner & Zahlbr.) Sérus.
Parmotrema neopustulatum Kurok.
[s]*Parmotrema ochrocrinitum* Elix & J.Johnst.
Parmotrema perlatum (Huds.) M.Choisy
Parmotrema reticulatum (Taylor) M.Choisy
[s]*Pertusaria albissima* Müll.Arg.
Pertusaria crassilabra Müll.Arg.
[a]*Pertusaria krogiae* A.W.Archer, Elix, Eb.Fisch., Killman & Sérus.
Pertusaria lophocarpa Körb.
Pertusaria pertractata Stirt.
[s]*Phaeophyscia endococcinodes* (Poelt) Essl.
Physcia adscendens (Fr.) H.Olivier
Physcia albata (F.Wilson) Hale
Physcia neonubila Elix
Physcia poncinsii Hue
Physcia rolandii Elix
Placidium pilosellum (Breuss) Breuss
Placidium squamulosum (Ach.) Breuss
[s]*Placynthiella icmalea* (Ach.) Coppins & P.James
Placynthium nigrum (Huds.) Gray *sens. lat.*
[s]*Polymeridium catapastum* (Nyl.) R.C.Harris
Porina corrugata Müll.Arg.
[s]*Porina subargillacea* Müll.Arg.
[s]*Porina whinrayi* P.M.McCarthy
Porpidia cf. *crustulata* (Ach.) Hertel & Knoph
[s]*Pseudocyphellaria aurata* (Sm.) Vainio
Pseudocyphellaria neglecta (Müll.Arg.) H.Magn.
Psora crystallifera (Taylor) Müll.Arg.
Psora decipiens (Hedw.) Hoffm.
[T]*Psoroglaena halmaturina* P.M.McCarthy & Kantvilas
[s]*Punctelia borreri* (Sm.) Krog
Punctelia pseudocoralloidea (Gyeln.) Elix & Kantvilas
Punctelia subalbicans (Stirt.) D.J.Galloway
Pyrenopsis sp.
Ramalina canariensis J.Steiner
[s]*Ramalina celastri* (Spreng.) Krog & Swinscow
Ramalina fissa (Müll.Arg.) Vainio
Ramalina glaucescens Kremp.
[s]*Ramalina inflata* (Hook.f. & Taylor) Hook.f. & Taylor
[s]*Ramalina unilateralis* F.Wilson
[s]*Ramboldia blastidiata* Kantvilas & Elix
Ramboldia crassithallina Kalb
Ramboldia laeta (Stirt.) Kalb, Lumbsch & Elix
Ramboldia plicatula (Müll.Arg.) Kantvilas & Elix
[s]*Ramboldia sorediata* Kalb
Ramboldia stuartii (Hampe) Kantvilas & Elix
Rhizocarpon geographicum (L.) DC.
Rhizocarpon reductum Th.Fr.
Rinodina asperata (Shirley) Kantvilas
Rinodina australiensis Müll.Arg.
Rinodina bischoffii (Hepp) A.Massal.
Rinodina blastidiata Matzer & H.Mayrhofer
Rinodina confragosula (Nyl.) Müll.Arg.
Rinodina confusa H.Mayrhofer & Kantvilas
Rinodina obscura Müll.Arg.
[s]*Rinodina oleae* Bagl.
Rinodina reagens Matzer & H.Mayrhofer
Rinodina thiomela (Nyl.) Müll.Arg.
[s]*Rinodina williamsii* H.Mayrhofer
Rinodinella fertilis (Körb.) Elix var. *fertilis*
[s]*Rinodinella fertilis* var. *hypostictica* (Elix) Elix
[T]*Sarcogyne meridionalis* P.M.McCarthy & Kantvilas
Sarcogyne sp.
[s]*Schismatomma occultum* (C.Knight & Mitten) Zahlbr.
[a]*Schismatomma rediunta* (Hasse) Tehler
[s]*Scoliciosporum umbrinum* (Ach.) Arnold
[s]*Sphinctrina leucopoda* Nyl.
[a]*Strangospora pinicola* (A.Massal.) Körb.
Teloschistes chrysophthalmus (L.) Th.Fr.
Teloschistes spinosus (Hook.f. & Taylor) J.S.Murray
Tephromela alectoronica Kalb
Tephromela atra (Huds.) Hafellner
[T]*Tephromela baudiniana* Kantvilas & Elix
[s]*Tephromela sorediata* Kalb & Elix
[s]*Thelenella tasmanica* H.Mayrhofer & P.M.McCarthy
[T]*Thelidium robustum* P.M.McCarthy & Kantvilas

Thysanothecium scutellatum (Fr.) D.J.Galloway
[S]*Thysanothecium sorediatum* Elix
[S]*Toninia aromatica* (Sm.) A.Massal.
Toninia australis Timdal
Trapelia coarctata (Sm.) M.Choisy
Trapelia crystallifera Kantvilas & Elix
[S]*Trapelia glebulosa* (Sm.) J.R.Laundon
[S]*Trapelia thieleana* Kantvilas, Lumbsch & Elix
[S]*Trapeliopsis flexuosa* (Fr.) Coppins & P.James
Tylothallia verrucosa (Müll.Arg.) Kantvilas
[S]*Usnea cornuta* Körb.
[S]*Usnea dasaea* Stirt.
Usnea inermis Motyka
[S]*Verrucaria alborimosa* P.M.McCarthy & Kantvilas
Verrucaria buelliicola P.M.McCarthy
Verrucaria calciseda DC.
Verrucaria compacta (A.Massal.) Jatta
Verrucaria fusconigrescens Nyl.
Verrucaria muralis Ach.
Verrucaria papillosa Ach.
Verrucaria subdiscreta P.M.McCarthy
Verrucaria sp. A
Verrucaria sp. B
Xanthoparmelia amplexula (Stirt.) Elix & J.Johnst.
Xanthoparmelia australasica D.J.Galloway
Xanthoparmelia bratti (Essl.) O.Blanco *et al.*
Xanthoparmelia cafferensis (Essl.) O.Blanco *et al.*
Xanthoparmelia congensis (J.Steiner) Hale
Xanthoparmelia conranensis (Elix) Elix
Xanthoparmelia delisei (Duby) O.Blanco *et al.*
Xanthoparmelia digitiformis (Elix & P.M.Armstr.) Filson
Xanthoparmelia elixii Filson
Xanthoparmelia exillima (Elix) Elix & J.Johnst.
Xanthoparmelia filarszkyana (Gyeln.) Hale
Xanthoparmelia flavescentireagens (Gyeln.) D.J.Galloway
Xanthoparmelia furcata (Müll.Arg.) Hale
Xanthoparmelia hybridiza Elix & J.Johnst.
[S]*Xanthoparmelia leucophaea* (Elix & J.Johnst.) Elix
Xanthoparmelia lithophiloides (Kurok.) Elix
Xanthoparmelia metaclystoides (Kurok. & Filson) Elix & J.Johnst.
Xanthoparmelia microcephala Elix & Kantvilas
Xanthoparmelia mougeotina (Nyl.) D.J.Galloway
Xanthoparmelia murina (Kurok.) Elix
Xanthoparmelia neodelisei (Elix) O.Blanco *et al.*
Xanthoparmelia neorimalis (Elix & P.M.Armstr.) Elix & T.H.Nash
Xanthoparmelia neotinctina (Elix) Elix & J.Johnst.
Xanthoparmelia nigraoleosa Elix & J.Johnst.
Xanthoparmelia parvoclystoides Elix & J.Johnst.
Xanthoparmelia pustuliza (Elix) Elix & J.Johnst.
Xanthoparmelia rimalis (Kurok.) Elix, A.Thell & Søchting
Xanthoparmelia rubrireagens (Gyeln.) Hale
Xanthoparmelia scabrosa (Taylor) Hale
Xanthoparmelia subloxodella (Elix & Kantvilas) O.Blanco *et al.*
Xanthoparmelia subprolixa (Nyl. ex Kremp.) O.Blanco *et al.*
Xanthoparmelia subverrucella (Essl.) O.Blanco *et al.*
Xanthoparmelia tasmanica (Hook.f. & Taylor) Hale
Xanthoparmelia tegeta Elix & J.Johnst.
Xanthoparmelia ustulata (Kurok. & Filson) Elix & J.Johnst.
Xanthoparmelia verrucella (Essl.) O.Blanco *et al.*
[T]*Xanthoparmelia wisangerensis* Elix & J.Johnst.
Xanthoparmelia xanthomelaena (Müll.Arg.) Hale
Xanthoria angustata S.Y.Kondr. & Kärnefelt
Xanthoria coomae S.Y.Kondr. & Kärnefelt
Xanthoria elixii S.Y.Kondr. & Kärnefelt
Xanthoria ligulata (Körb.) P.James
Xanthoria sp.

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South Australian lichens — A Kangaroo Island case study

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Abstract: An eight-year study of the lichens of Kangaroo Island, based on extensive field work and a review of herbarium records, has revealed a diverse flora of more than 350 species. Of these, 24, including 15 that are endemic to the island, have been described as new to science. Many other species are new records for South Australia, Australia or the Southern Hemisphere. Most species recorded are shared with mainland southern Australia, and/or with Tasmania and its off-shore islands. A large number are uncommon on Kangaroo Island and restricted to highly specialised habitats. Land clearing, fire and other disturbances have fragmented some vegetation types and reduced the lichen flora drastically. Hence rocks, isolated trees and small wooded copses provide important but highly fragile lichen refugia in an otherwise severely modified landscape. *Melaleuca*-dominated swampy woodland, *Callitris*-dominated woodland, mallee woodland and calcareous soil communities are discussed briefly as examples where fragmentation has been particularly severe. The rare and locally endangered *Pseudocyphellaria aurata* (Ach.) Vain. and the seemingly extinct *Cladia ferdinandii* (Müll.Arg.) Filson are two examples of the depletion of the lichen flora.

Keywords: conservation, diversity, habitat fragmentation, lichenised fungi, rare species

Introduction

South Australia is relatively poorly explored lichenologically, largely due to there being no lichenologist active or resident in the State. Thus, most floristic lichen data are the result of fortuitous collecting and visits by lichenologists from other jurisdictions and often based on specimens held in the herbaria of other states or territories. As a result, McCarthy (2017) records only approximately 570 taxa for South Australia, compared to Tasmania's 1200 and Queensland's almost 2000 taxa.

With an area of approximately 4400 km^2, Kangaroo Island, off South Australia's south-eastern coast, is Australia's third largest island. In 2008, a project to catalogue the lichens of Kangaroo Island commenced and the results of this work will be reported in detail in a forthcoming publication. The present paper offers an introduction and overview of this work and demonstrates the diversity of lichens that awaits discovery given a thorough investigation.

Outline of the KI Lichen Catalogue Project

Prior to the commencement of the project, the lichens of Kangaroo Island had been investigated only cursorily (Table 1). The author's interest in the island's flora commenced in 2008 with some opportunistic holiday collecting that resulted in the discovery of *Ochrolechia insularis* Kantvilas & Elix (Lumbsch *et al.* 2011). Further annual visits and field work ensued, followed by a review of every herbarium specimen that could be located (chiefly in the herbaria of Adelaide, Brisbane, Canberra and Melbourne, although several others were searched or consulted) and targeted exploration of particular habitats and areas.

Table 1. Lichenological exploration of Kangaroo Island since first European contact in 1802.

period	herbarium specimens collected	major collectors	number of first records for the island
up to 1900	2	Tepper	2
1900–1980	c. 125	Cleland, Seppelt, Jackson	47
1980–2007	c. 460	Stove, Elix, Lumbsch, Streimann, Rogers	119
2007–present	930	Kantvilas	182+

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Floristic results

At present, more than 350 taxa have been recorded. This figure includes 24 species newly described based on recent collections from the island (Table 2), more than 85 new records for South Australia and a further 16 additional species that represent new records for Australia and, in some cases, the Southern Hemisphere; these will be reported separately. Research on herbarium specimens is ongoing and further new species and new records are anticipated by the time the catalogue is published. A complete list of lichens for an area as large as Kangaroo Island is an impossible goal, as there will always be areas and habitats that will not have been comprehensively examined. However, more than 400 taxa is considered a reasonable estimate of the island's lichen species richness.

The distribution and composition of the island's lichen flora is determined chiefly by vegetation type and geology and is generally typical for the relatively dry, lowland or maritime areas of southern Australia that enjoy a Mediterranean-type climate. Most of the common species are widely distributed across this region. The largest genera present include *Caloplaca* Th. Fr. (31 species), which is responsible for the conspicuous orange and yellow banding of the littoral zone, whereas in dry sclerophyll woodland, the foliose genus, *Xanthoparmelia* (Vain.) Hale (38 species) predominates. Other species-rich genera include *Lecanora* Ach. (17 taxa), *Rinodina* (Ach.) S.F.Gray (11), *Buellia* De Not. *s. lat.* (22), *Verrucaria* Schrad. (9) and *Lecidella* Körb. (8). Curiously, several conspicuous components of the southern Australian flora have not been recorded, such as the genus *Hypogymnia* Nyl. and the common, yellowish, littoral crustose species, *Lecanora subcoarctata* (C.Knight) Hertel. While being represented by 11 taxa, the genus *Cladonia* Hill ex P.Browne is rarely abundant, despite the apparent abundance of suitable habitat in woodlands and heathlands.

Table 2. Lichens based on type specimens from Kangaroo Island.

taxon	reference	distribution
Amandinea devilliersiana Elix & Kantvilas	Elix & Kantvilas (2013a)	KI, Tas
Amandinea dudleyensis Kantvilas & Elix	Elix & Kantvilas (2013a)	KI
Amandinea lignicola var. *australis* Elix & Kantvilas	Elix & Kantvilas (2013a)	south-eastern Australia, Tas
Anisomeridium austroaustraliense McCarthy & Kantvilas	McCarthy & Kantvilas (2016a)	KI
Arthonia caliciae Kantvilas & Wedin	Kantvilas & Wedin (2015)	KI
Arthonia insularis Kantvilas & Wedin	Kantvilas & Wedin (2015)	KI
Bacidia brigitteae Kantvilas	Kantvilas (2017)	KI
Buellia extenuatella Elix & Kantvilas	Elix & Kantvilas (2013b)	southern mainland Australia
Buellia subadjuncta Elix & Kantvilas	Elix *et al.* (2017)	KI
Caloplaca aggregata Kantvilas	Kantvilas (2016)	KI
Caloplaca gilfillaniorum Kantvilas & S.Y.Kondr.	Kantvilas & Kondratyuk (2013)	KI
Caloplaca piscatorica Kantvilas & S.Y.Kondr	Kantvilas & Kondratyuk (2013)	KI
Caloplaca sergeyana Kantvilas	Kantvilas (2016)	KI
Catillaria austrolittoralis Kantvilas & van den Boom	Kantvilas & van den Boom (2013)	south-eastern Australia, Tas.
Lecania maritima Kantvilas & van den Boom	Kantvilas & van den Boom (2015)	south-eastern Australia, Tas.
Lecidella granulosula var. *lecanorina* Kantvilas & Elix	Kantvilas & Elix (2014)	KI, NSW, Tas
Lecidella leucomarginata Kantvilas & Elix	Kantvilas & Elix (2014)	KI, WA
Ochrolechia insularis Kantvilas & Elix	Lumbsch et al. (2011)	KI
Pertusaria melanospora var. *sorediata* Elix & Archer	Elix & Archer (2013)	south-eastern Australia, Tas
Psoroglaena halmaturina McCarthy & Kantvilas	McCarthy & Kantvilas (2013a)	KI
Sarcogyne meridionalis McCarthy & Kantvilas	McCarthy & Kantvilas (2013b)	KI, SA, Flinders Island
Tephromela baudiniana Kantvilas & Elix	Kantvilas & Elix (2017)	KI
Thelidium robustum McCarthy & Kantvilas	McCarthy & Kantvilas (2016b)	KI
Xanthoparmelia wisangerensis Elix & J.Johnst.	Elix & Johnston (1987)	KI

A feature of the flora is that despite the large number of taxa recorded, most are relatively uncommon and have narrow ecological niches and/or limited distribution. An excellent example is *Ephebe ocellata* Henssen (Fig. 1A), which is restricted to semi-inundated rocks in fast flowing fresh water. This is a very uncommon habitat on Kangaroo Island, but it is potentially rich in aquatic lichens, such as species of the Lichinaceae. Similarly, the dry, bleached lignum of old, dead eucalypt trees has yielded several unusual records, such as *Schismatomma dirinellum* (Nyl.) Zahlbr. (Fig. 1B) (the first record for the Southern Hemisphere). Also present in this habitat are several taxa of calicioid lichens, a group that is frequently associated with old trees in old growth forests in many parts of the world (Selva 1998). The minute, temperate Northern Hemisphere species, *Strangospora pinicola* (A.Massal.) Körb. (another first for the Southern Hemisphere), was recorded from *Melaleuca* in old mallee woodland, whereas the widespread, temperate Northern Hemisphere forest species, *Micarea prasina* Fr. (Fig. 1C), is but one of several remarkable records from remnant *Callitris* woodland. *Pannaria obscura* Müll.Arg. (Fig. 1D), although not rare on the island, is one of relatively few cyanobacterium-containing species present and tends to be an indicator of moister, undisturbed sites where other unusual species may be present. Fifteen species are endemic to the island (Table 2), although this is most likely the consequence of detailed, localised study and, with further exploration, these species could be expected to be found further afield.

Conservation status of the flora

With its small population, relative isolation and having one quarter of its land area in nature reserves, it is indisputable that Kangaroo Island has retained a significant element of its natural environment. At the same time, the island has been hugely modified by man and land clearing has been extensive (Fig. 2). Fire has been a recurring phenomenon (Peace & Mills 2012) and is potentially very severe in the absence of natural boundaries such as large rivers or mountains. Apart from its immediate impact, fire affects the lichen flora by removal or reduction in the age of the understorey. A large component of the lichen flora is epiphytic and shows a preference for subdominant trees and shrubs such as *Allocasuarina*, *Exocarpos* and species

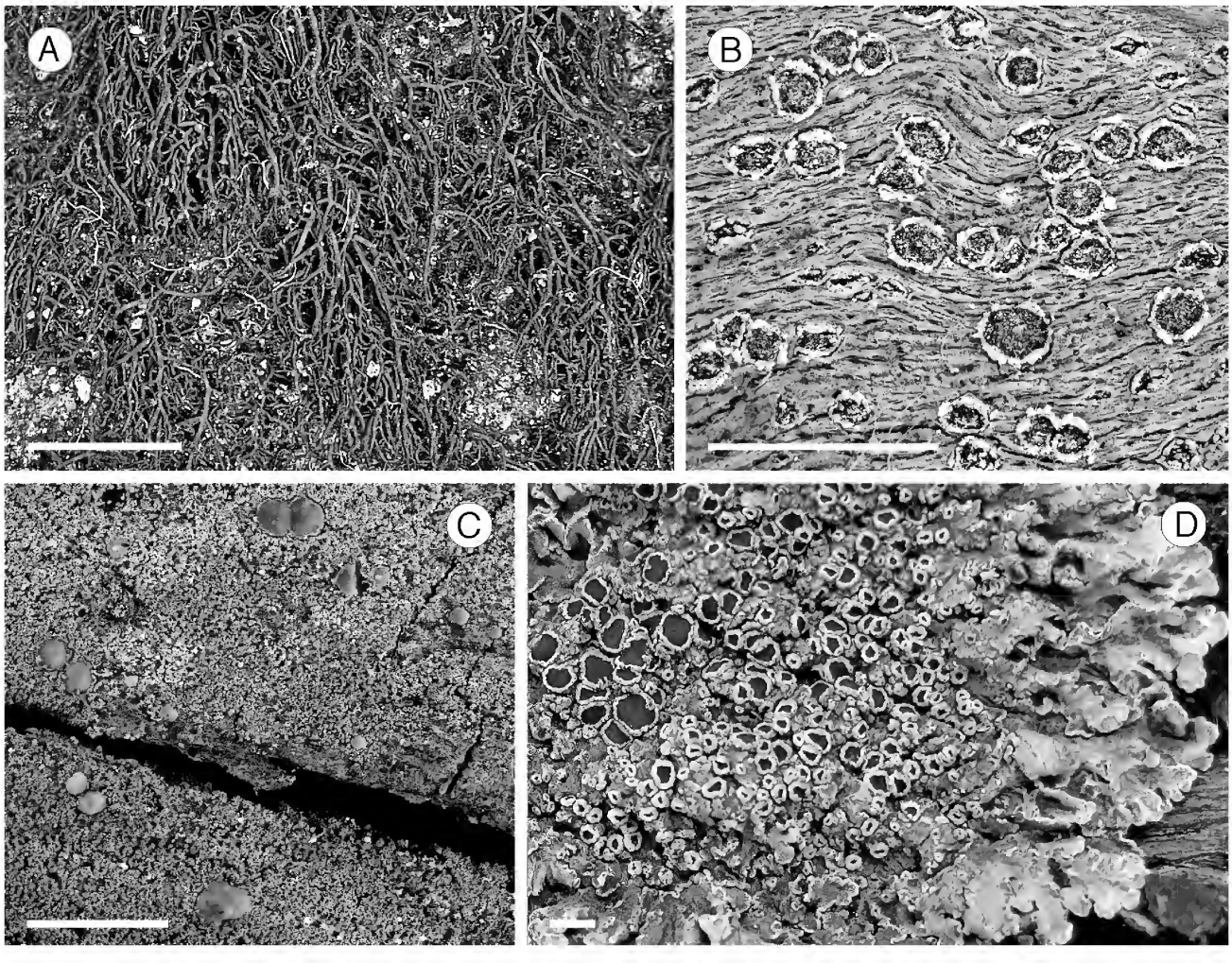

Fig. 1. Noteworthy Kangaroo Island lichens. **A** *Ephebe ocellata*; **B** *Schismatomma dirinellum*; **C** *Micarea prasina*; **D** *Pannaria obscura*. Scale = 2 mm. Photos: J. Jarman.

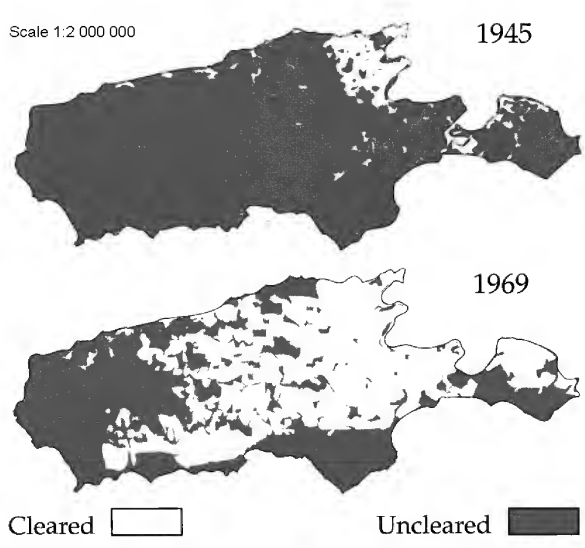

Fig. 2. Changes in natural vegetation cover on Kangaroo Island (taken from Barker & McCaskill 2007).

of Myrtaceae. Whilst this vascular component of the vegetation may recover quickly after fire, its stems are invariably too young to support diverse associations of epiphytes. The blaze of 2007 destroyed about 20% of the island, especially reserved areas. The fire was clearly very hot and after more than seven years, recovery of lichens has been minimal.

Fragmentation of the natural vegetation has also had a major impact on the lichens. The first European accounts of the island, for example by Peter Good (Edwards 1981) and Robert Brown (Vallance *et al.* 2001) from the *Investigator* voyage, refer to it as being "wooded". Whilst these impressions were formed chiefly from the shoreline or the summit of Prospect Hill (one of the best vantage points on the island), one can infer that there was a more or less continuous cover of forest, woodland or heathland over much of the island. Today, there are extensive nature reserves, but

Fig. 3. *Melaleuca*-dominated swampy woodland: intact stand (above); highly fragmented and disturbed stand (below).

these are concentrated in the west and south, catering well for some vegetation formations, but less so for others. Elsewhere, large tracts of land have been cleared and converted to pasture, stretches of the coastline have been developed for housing and recreation and there are extensive areas of eucalypt and pine plantation. As a result, some woodland types that support many rarer components of the lichen flora have been severely fragmented and continue to degrade. The following serve as examples of vegetation where the effect of degradation is especially obvious.

***Melaleuca*-dominated swampy woodland** (Fig. 3). This vegetation type occurs on the fringes of lagoons and larger estuaries. It is perhaps the closest vegetation type to a wet forest on the island and one where an exceptional lichen flora might be expected. However, although many stands appear intact from a distance, closer inspection reveals broken, disturbed canopies, larger trees uprooted by the wind, and weed-choked understoreys. As a result, epiphytes are rare or absent and the main species present are ones with broad ecological amplitudes, such as *Austroparmelina pruinata* (Müll.Arg.) A.Crespo *et al.* and *Physcia poncinsii* Hue.

***Callitris*-dominated coniferous woodland** (Fig. 4). These woodlands are found on the coast of the Dudley Peninsula, usually on or behind sand dunes and consist of tiny, fragmented stands that are collapsing. Here several small crustose species with world-wide distributions in temperate, oceanic woodlands were recorded; for example, *Arthonia ilicina* Taylor, *Cliostomum griffithii* (Sm.) Coppins and *Micarea prasina* Fr. All were represented by minute thalli hidden in cracks in the bark of decrepit trees where their long-term survival is unlikely.

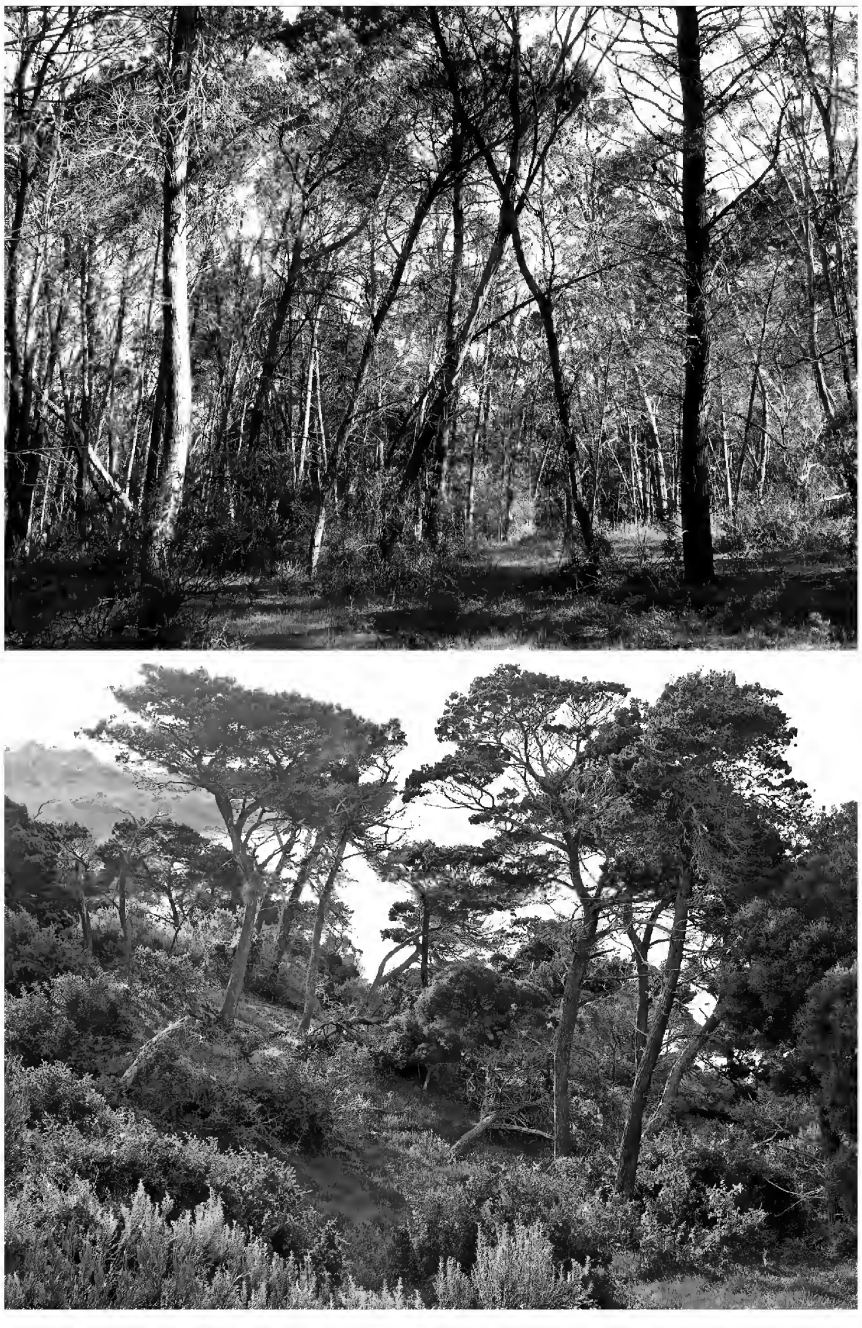

Fig. 4. *Callitris*-dominated coniferous woodland: relatively intact stand (above); highly fragmented remnant with a weed-choked understorey (below).

Mallee woodland (Fig. 5). When occurring in continuous stands with old dominant trees and a diverse understorey, this vegetation is rich in epiphytic lichens. Standing dead, dry trees, the moist basal stockings of living trees and the understorey shrubs are potentially well colonised. Several species that contain cyanobacteria as their main photobiont have been recorded in such woodlands, including *Fuscopannaria decipiens* (P.M.Jørg. & D.J.Galloway) P.M.Jørg. and *F. minor* (Darb.) P.M.Jørg. Unfortunately, in many places, mallee has been reduced to narrow avenues where windthrow has caused canopy collapse, increased air circulation and sunlight have dried the microclimate, and browsing by stock impedes regeneration.

Consolidated, calcareous soil. Past herbarium records suggest that soil-inhabiting crustose lichen communities, dominated by *Psora decipiens* (Hedw.) Hoffm. and *Gyalolechia* (*Fulgensia*) *cranfieldii* (S.Y. Kondr. & Kärnefelt) Søchting *et al.*, were more extensive in the past. Today these potentially species-rich communities are reduced to narrow strips between improved pasture and cliff edges, road-side remnants or simply a few square centimetres of soil between larger stones.

The result of changing land-use is that some species recorded for the island in earlier times seem to be no longer present or are exceedingly rare and that rocks, isolated trees and small wooded copses provide important but highly fragile lichen refugia in otherwise severely modified landscapes. Two conspicuous species serve as examples of these floristic changes:

Cladia ferdinandii (Müll.Arg.) Filson (Fig. 6A). This striking species of 'coral lichen' is known only from south-western Western Australia and southern South Australia (Filson 1992) and was last collected on KI

Fig. 5. Mallee woodland: extensive and continuous stand (above); remnant narrow farm corridor (below).

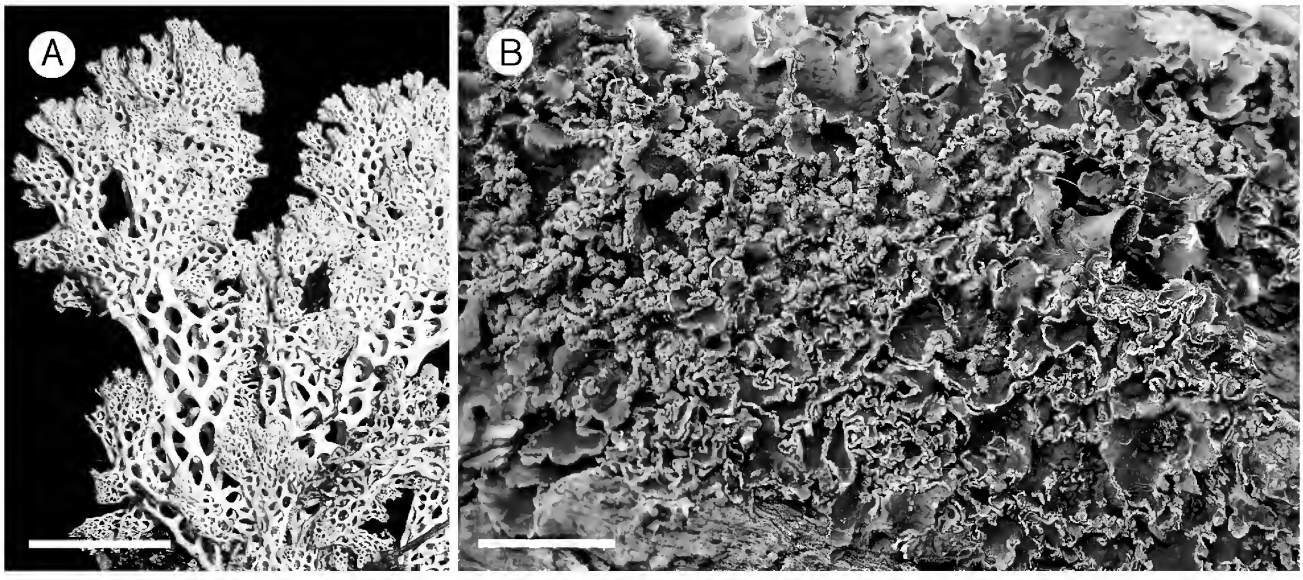

Fig. 6. Rare Kangaroo Island lichens. **A** *Cladia ferdinandii* (presumed extinct); **B** *Pseudocyphellaria aurata* (rare and at risk). Scale = 10 mm. Photo A: J. Jarman.

in the 1990s from near Kingscote Airport. It could be expected to occur near the coast on sandy open ground in heathland or beneath sparse *Melaleuca*. It was searched for extensively without success and is presumed to be now extinct on the island. Although its past known locations are rather vague, the general areas they represent have been severely modified or degraded. Elsewhere in South Australia, this species is severely threatened by development (Elix 2005).

Pseudocyphellaria aurata (Ach.) Vain. [syn. *Crocodia aurata* (Ach.) Link] (Fig. 6B). This is a cosmopolitan lichen of moist, oceanic woodlands, with a widely scattered, coastal Australian distribution. It was first recorded for Kangaroo Island in the 1970s, presumably from *Melaleuca* woodland fringing Lashmar Lagoon. This and many other sites were searched for this species and just one population, comprising a few thalli on about six, precariously leaning, older mallee stems, was found. This species is at serious risk.

Conclusion

Whether Kangaroo Island is special for lichens depends very much on one's perspective. Compared to places such as Tasmania, the island is of low relief (the highest point just 300 m above sea level), no place is more than 25 km from the coast and the annual average rainfall is only 500 to 700 mm per year. These factors lead to relatively low habitat diversity, which usually translates into low lichen species richness. On the other hand, the island has a highly variable geology and a fascinating littoral zone where siliceous and calcareous rock types occur in close juxtaposition. Despite the impact of wildfire and land clearing, small areas of exceptional lichenological interest remain intact. The Kangaroo Island Lichen Project offers an insight into the potential lichen diversity yet to be discovered elsewhere in South Australia.

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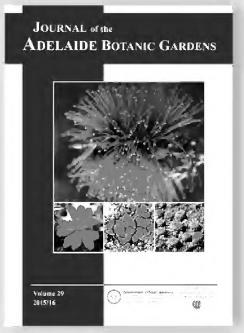

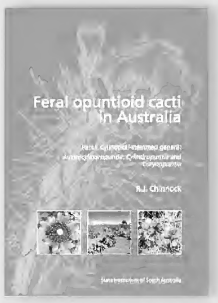

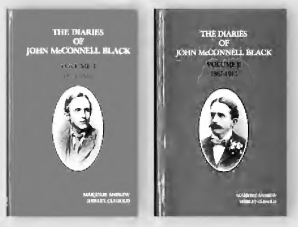

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